

# ASTOUNDING

JAN '42

*Science Fiction 25¢*



## BREAKDOWN

by JACK WILLIAMSON

JANUARY • 1942

A STREET AND SMITH PUBLICATION



BEFORE

#### NOTE HOW LISTERINE GARGLE REDUCED GERMS

The two drawings illustrate height of range in germ reductions on mouth and throat surfaces in test cases before and after gargling Listerine Antiseptic. Fifteen minutes after gargling, germ reductions up to 96.7% were noted; and even one hour after, germs were still reduced as much as 80%.



AFTER

## AT THE FIRST SYMPTOM OF A COLD OR SORE THROAT—Listerine, *QUICK!*

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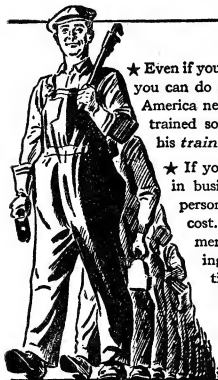
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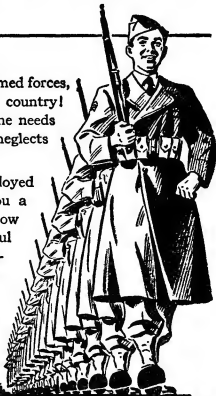
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# ASTOUNDING

## SCIENCE-FICTION

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# PRESSING PROBLEM

The pressing problem of interplanetary flight is going to be literally, exactly that—acceleration pressure. Long, wild and futile have been the arguments and statements made in science-fiction stories and reader-letters on the question of the exact resiliency of the human frame. At last, some honest figures, determined by careful and exact research, are available. The results don't look too promising.

First, the method, and the reason for the research. The work was done for army air-corps medical purposes. Their question was the result of pursuit ship maneuvering, dive bombing and similar problems. Crashes, involving high negative accelerations, also enter into the thing.

The method varied, but the most important research tool was a little compartment on the end of a long, very strong arm which could be whirled about a central shaft by powerful motors. This permitted very considerable accelerations—up to 15 or more times gravity—by developing high centrifugal forces.

The amount of acceleration a man can endure varies, understandably, with his position, and the direction of the acceleration. It also varies with fatigue, diet, general physical condition, and, seemingly, the phase of the moon and the look of the weather. It's roughly predictable, but only roughly. Naturally, too, while a man can safely endure 10 gravities for a few seconds, it does *not* mean that he can endure 10 gravities acceleration for half an hour or so.

Position is the most important single factor, obviously. The absolute optimum seems to be the prone position, flat down on a firm, but yielding surface. Perhaps an air-foam rubber mattress would serve nicely for that. In this position, an acceleration of as much as 15g—15 times normal gravity—can be endured in safety, with no damage. But—the man can't breathe after the acceleration passes about 8g. That 15g acceleration is definitely limited in time. If it were extended to the point of unconsciousness in duration, it would probably cause real trouble. And because the internal organs are being protected against damage and held in place only by the straining efforts of the great body muscles, the breath can't be held long. Those big muscles, all over the body, straining against the pressure, are going to consume the available oxygen in the blood and the lungs in a hurry.

Prone, breathing becomes barely possible at about 8g. It's extremely labored, and not everyone can do it then. Further, the breathing probably isn't very useful even at 8g. If it is that

difficult, it's a fair bet that it's pretty slow and gasping, with a small oxygen intake as a result. Since the body will be working hard in an all-over way due to the acceleration, slow and gasping breath will be practically useless, an academic point rather than a useful accomplishment.

Lowering the acceleration to 5g, a strong man can barely begin to perform coarse manipulation functions. He might flip a switch or perform some similar on-off, yes-no operation. But he couldn't be relied on to make any adjustments, to correct a course or adjust the fuel feed for a slightly higher or lower acceleration.

Not until the acceleration dropped to 3g would a man in a prone position—the optimum condition—be able to breathe and live reasonably comfortably. Even then manipulation is difficult, though possible. Fuel-feed adjustments, course corrections and similar things should, probably, be controlled by a step-by-step method, with a series of tumbler switches cutting in or throwing out the separate steps. Vernier adjustments, even at 3g would probably be none too reliable.

In a seated position, with acceleration in a direction pressing the body down into the seat, the endurance is far less. At 2g, the principal effect is a feeling of increased weight, the limbs feel loaded and pulled downward out of their natural position. At 3g, the feelings are exaggerated, the feeling of being pressed down into the seat is straining. Probably—though all these tests, being intended for airplane maneuver results, where two or three seconds is all that need be considered—the limit of acceleration endurable for any length of time—minutes—has already been reached.

At 5g the body is markedly compressed, vision is severely disturbed in even a few seconds, a gray veil seeming to form before the eyes. The head feels—and, in photographs, looks—shoved down between the shoulders. Even the cheeks sag downward, with an effect of heavy, drooping jowls. The whole face shows, in pictures taken during the test, an expression of intense strain.

Between 6 and 8gs, unconsciousness results, the head is driven down between the shoulders, the relaxed lower jaw is pulled down, the whole face distorted into a grimace of twisted strain.

"Standing up to it" in the literal sense seems to be exceedingly poor judgment. The standing position is by far the most dangerous. British authorities have reported on the results of such happenings in war experience. The tail gunner in a big bomber is usually in a standing position, and if the plane's pilot is forced to perform some drastic maneuvers to escape attackers, the tail

gunner, as usual, gets the worst of it.

In practice, accelerations of 3 to 4g's lead to broken bones in the lower legs and feet, pulled and ruptured ligaments, and general injury due to falling after failure of a leg bone. At 5g, even under the most ideal conditions, it is impossible for a man to stand. When he does collapse, the results are apt to be extremely serious or fatal. Falling four feet or so under an acceleration of 5g means that the man is hurled down with savage violence.

The effects of acceleration on the internal economy depend largely on two factors: sheer mechanical force and disturbance of the distribution of body fluids. The brain is not injured even at accelerations as high as 5g, because the brain is floated completely in the spinal fluid, a liquid designed for the purpose and so carefully adjusted in specific gravity that the delicate nerve-tissue is practically weightless and massless. The large organs of the abdomen are protected because they are so crowded they cannot shift appreciably so long as the large and extremely powerful abdominal muscles can support the strain. Since the abdominal muscles are developed to meet the strains imposed by such movements as pulling the upper trunk into a seating position from lying back down on the floor, even the 5g strain weight of the abdominal organs can be borne fairly well.

The troubles in acceleration come from body fluid distribution, so long as the rather high limits of mechanical strength aren't exceeded. The trouble with fluid distribution arises mainly from the fact that man evolved in an environment with practically no acceleration change whatever. Jumping, falling, blows in fighting have all tended, through the ages, to impose sudden and great strains on the mechanical design of the body. A fall or jump from a few feet can impose momentary stresses of 15 to 20gs. To jump upward even a little distance requires a momentary application of 2 to 3g strains. The muscles, bones and mechanical structure evolved to meet those conditions.

But fluids are held in their normal distribution by blood vessels and delicate osmotic pressure balances. The blood plasma can seep through blood-vessel walls. Lymph bathes the cells of the body outside the blood vessels. In a six-foot man, there's a very decidedly greater blood pressure in the arteries in his ankle than in the arteries of the skull and brain. There's a five-and-a-half-foot column of liquid to make that difference.

But that's allowed for in the design; the blood vessels of the lower legs are much stronger than those of the brain. They can equalize that difference neatly. They can, that is, so long as the acceleration acting on that column of liquid is the Earth-normal acceleration they've spent the

last half billion years adjusting themselves to. If it exceeds that—

Fluid begins to seep between the cells of the blood-vessel walls. Fluid seeps downward through the tissues of the legs, through the abdomen. Blood in the veins accumulates, unable to fight its way back against the increasing pressure to reach the heart.

And the brain starves for lack of blood. In one test, 15 seconds were required to raise the acceleration from normal to  $8\frac{1}{2}g$ , the acceleration was maintained at  $8\frac{1}{2}g$  for 10 seconds, and lowered to normal in another 15 seconds. The blood pressure in the brain, in that brief time, fell from the normal 100 mm to 15 mm. With so little blood reaching the brain, oxygen and food starvation set in very quickly. Unconsciousness would be followed in a very few minutes by tissue-death, since the nerve cells are extremely sensitive to oxygen lack, and that would mean permanent injury to the mind even if the acceleration were relieved then.

This consideration leads to an obvious suggestion for countering it. Fluid distribution causes the trouble. Let's put fluid *outside* the body to force the internal fluids to remain in normal distribution. Blood seeps out of the leg blood vessels because of too-great internal pressure—but not if we apply an equal external pressure.

I suggested something on that order some years ago, having the hero withstand an emergency extreme acceleration of over 30 gravities by floating in water. Naturally, as his body got "heavier," the displaced water did, too, so flotation would remain. Further, fluid distribution within the body would be maintained by the counter-pressure of fluid outside.

It seemed like a nice—if somewhat damp—idea at the time. The Germans have adapted it in a more practical application. They've evolved a special water suit, an inverse diving suit with an ordinary-way diving suit inside for divers who do their diving in Stukas. Dive-bomber pilots get the most severe strains of any type of airmen due to the inherent character of their weapon. The suit seemingly consists of a rubber inner suit that fits skin-tight, and an outer water-tight suit made of strongly braced material with joining at the knees, ankles, et cetera, designed to bend, but not to stretch. The pilot gets in, and the suit is then poured full of water—at body temperature, presumably—and laced tight. The inner, flexible rubber skin is then under fluid pressure whenever the plane makes a violent maneuver. The pilot's body is relieved of the effects of fluid movement. Reports are that, with this type of suit, the seated pilot can maintain consciousness at accelerations well above 8g, and can safely endure accelerations as heavy as 15g.

*The Editor.*

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By G.A.M.  
(NAME AND ADDRESS UPON REQUEST)



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# BREAKDOWN

By Jack Williamson

● It was a stable society, based on interplanetary ships and interplanetary shipping. And its stability doomed it! Breakdown was inevitable unless—

Illustrated by Kramer

Officially, Boss Kellon was merely executive secretary of the Union of Spacemen, Managers & Engineers. But *boss*, now in 2145, was equivalent to *caesar*. From the unitron convertors on Mercury to the lonely mining outposts scattered across the Jovian moons, the Union dominated mankind.

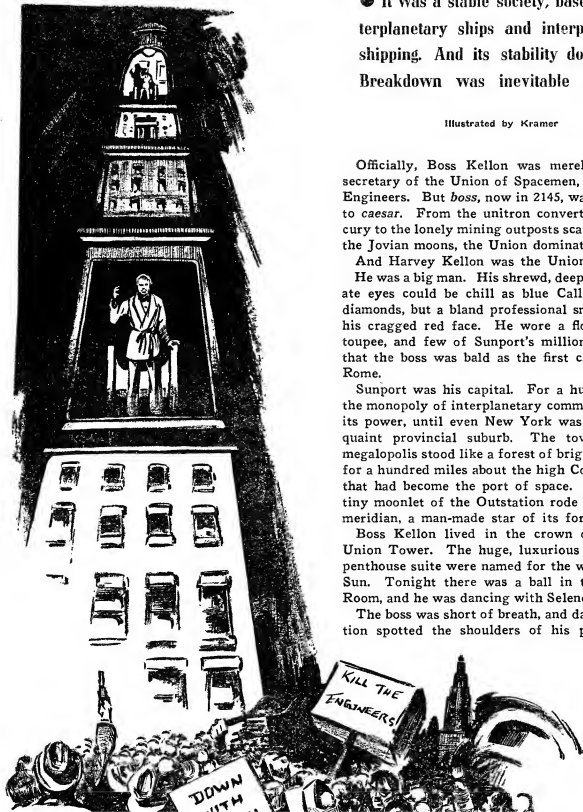
And Harvey Kellon was the Union.

He was a big man. His shrewd, deep-set, deliberate eyes could be chill as blue Callistonian fire diamonds, but a bland professional smile warmed his cragged red face. He wore a flowing white toupee, and few of Sunport's millions suspected that the boss was bald as the first caesar of old Rome.

Sunport was his capital. For a hundred years the monopoly of interplanetary commerce had fed its power, until even New York was now only a quaint provincial suburb. The towers of the megalopolis stood like a forest of bright monoliths for a hundred miles about the high Colorado mesa that had become the port of space. Forever the tiny moonlet of the Outstation rode at the city's meridian, a man-made star of its fortune.

Boss Kellon lived in the crown of the lofty Union Tower. The huge, luxurious halls of his penthouse suite were named for the worlds of the Sun. Tonight there was a ball in the Neptune Room, and he was dancing with Selene du Mars.

The boss was short of breath, and dark perspiration spotted the shoulders of his purple dress



pajamas. His feet ached. Perhaps, at sixty, he was too old to be dancing; certainly he had too much weight about the middle. But Selene du Mars could make men seek to banish such uncomfortable thoughts.

She was tall and supple and green-eyed. She had been a famous television dancer. He thought she was the most costly and glittering thing in all Sunport. Tonight her hair was platinum, and she was dazzling with fire diamonds. He thought those favorite stones were like herself—cold and bright and hard. But he could admire even her calculating ambition, because it was so akin to his own.

Selene claimed a hereditary degree in militechnic engineering. Once Kellon had ordered a quiet investigation, and the Goon Department reported evidence of forgery. Her father had been merely the servant of a militechnic officer, on Jupiter Station. But Kellon suppressed the report, with not a word to Selene. He knew how hard was the climb up from the gray.

Now, and not for the first time, she was wheeling him to crown himself. Her voice was cool and perfect as her long body, and she used the flattering address that she herself had first suggested:

"Your genius, can we have the coronation soon? Everything is planned. Your historian friend Melkart has dug out the old ceremonies for me. My jewelers are working on a fire-diamond crown."

"For me to pay for," Kellon chuckled, and drew her pantherine body close against him. "Darling, I know you want to be Empress of the Sun, but your pretty head is in danger enough, without a coronet."

Kellon frowned, sobered by the thought. He had climbed to the perilous apex of a human pyramid. He was first of the million hereditary engineers, who, with their families and the various grades of their retainers, occupied nearly all the upper-level towers of Sunport.

But, here in Sunport alone, nearly eighty million more were the gray of labor. They dwelt and toiled in the subsurface levels, and the Goon Department bound their lives with iron restrictions. Kellon knew how they lived—because he had been one of them.

Most of them hated the technician nobility of the Union. That was the dangerous flaw in the pyramid. Kellon had once tried to mend it, with reforms and concessions. But Melkart warned that he was three generations too late. Yielding to that hatred, he was merely paying out the rope to hang himself.

"We're dancing on a volcano, darling," he told Selene. "Better not poke the fire!"

Selene's bare shoulders tossed, and her eyes flashed dark as her emerald-sequined gown. But she curbed her displeasure. She knew that a hun-

dred other women in the long, green-lit hall would have murdered gladly for her place in Kellon's arms. Her frown turned to a pretty pout.

"Please, your genius." Her perfect face winced slightly. Kellon knew that he had stepped on her silver slipper. But she smiled again, shrugging off his apology. "It wasn't caution that conquered the planets for you," she chided. "Your genius isn't getting old?"

That was his vulnerable point, and Selene knew it. Perhaps he was. The details of administration were increasingly burdensome. It was hard to find trustworthy subordinates. Sometimes he felt that the Union itself was slipping into decadence, as he grew older.

"The coronation—" her coaxing voice went on.

But Kellon stopped listening. He let her dance out of his arms. He watched the thin man threading toward him through the press of bright-clad engineering aristocracy wheeling about the dance floor.

The thin man was Chief Marquard of the Goon Department. He wore wine-colored formal pajamas and a jeweled Union star. But he had no partner, and his harassed expression meant bad news. Kellon braced himself for trouble.

"Your genius, it's the Preacher!" The whisper was hoarse with strain. "He's here in Sunport." Marquard gulped and wet his lips. "Still in hiding—somewhere down in the drainage levels."

This was more than merely trouble. Kellon swayed. The lofty shining murals blurred. He saw instead the dark, dripping tunnels, a thousand feet beneath the pavements of Sunport. Once he had hidden there himself, a hunted man in gray. The syncopated drone of the orchestra was suddenly the throb of drainage pumps.

Kellon's thick, pink hands made a desperate clutching gesture. He had watched the spread of the Gray Crusade, a poison that attacked the Union and rotted the very fabric of civilization. For years the Goon Department had sought the Preacher, in vain. But it was hard to believe that the fanatic had dared to enter Sunport.

He was getting old, indeed. Old and alone. He felt helpless against the demands of this grim moment. Suddenly he was almost ill with a desperate regret for the quarrel with his son. Family loyalty, in this cynical metropolis, was almost the only dependable bond. Now he needed Roy, terribly.

Dazed by the impact of this emergency, his mind slipped back into the past. To Roy, and Roy's mother. It had been Melkart who first introduced the slender, gray-eyed girl. They were at a secret meeting, down in the drainage ways. Melkart said proudly, "Ruth is going to be the Joan d'Arc of the New Commonwealth."

Perhaps Ruth had loved Melkart. Kellon was

never sure. For the secret police of the Corporation raided the party headquarters, a few months later. Melkart was captured and transported to Mars. It was only after she had received a false report of Melkart's death, that she would marry Kellon.

Kellon was responsible for that report. He had tried to atone for it, however, with the parole he secured for Melkart as soon as he had sufficient influence.

Ruth had never abandoned her dream of the New Commonwealth. She had not approved the methods of Kellon's rise to power, and she was deeply hurt when he ordered the Union Goons to hunt down the few surviving members of the party. Roy was twelve years old when she died.

Roy was like his mother—lean, intense, idealistic. Kellon was delighted when the boy wanted to take practical degrees in unitronic engineering—it helped him forget that his own hereditary titles were forgeries.

But Roy had been a bitter disappointment. He failed to show any interest in Union politics. He refused to enter the Militechnic College, to prepare for command and promotion in the Fleet. Instead, at twenty, he had gone to waste a year with some meaningless research at the solar power plants on Mercury.

The quarrel happened after Roy returned—five years ago. Roy didn't like Selene du Mars. She made matters worse by trying to flirt with him. He called her an unpleasant name, and stalked out of the penthouse suite. He had never come back.

But Kellon had followed him, next day, to the great unitronics laboratory on the mesa. A silent crystal egg, his unitron glider sloped down toward the long, low, white-roofed building that stood between the commercial port and the militechnic reservation.

Like an elongated silver bubble, a freighter was lifting from the Venus Docks, bright and strange in the shimmer of its drive field. Gray stevedores were trucking away the gleaming metal ingots and squared hardwood logs it had unloaded. A Martian liner lay in her cradle, spilling dark ore concentrate down a chute. A space-battered Jovian relief ship was loading mountains of crates and bales and drums—food and equipment and power for the miners on Callisto. The Mercury Docks were stacked with crated dynode batteries, freshly charged in the Sun plants. All the commerce of an interplanetary empire!

But Kellon's pride had a bitter taste. He could remember when the port was far busier, back in the days of the Corporation. Now half the yards were weed grown and abandoned. Dismantled ships were turning red with rust in the cradles at the disused Saturn Docks.

His oilot landed the glider on the white roof.

Kellon asked for his son, and a startled watchman guided him down through the laboratory. Space had really been conquered in this building, Kellon knew; all the great advances in unitronic flight had been made here. But most of the halls were deserted now, the old equipment dismantled or ruined.

Kellon found Roy in a long, clean shop whose plastic walls were softly radiant with a clear blue-white. Huge windows looked out across the militechnic reservation, where the unitron cruisers of the Fleet lay like immense dead-black arrows.

Roy was bronzed with spaceburn from his year on Mercury. He looked up, with his mother's nervous quickness, from some gadget on a bench. Kellon was a little shocked to see the screwdriver in his hands—for an engineer of the higher ranks, any sort of manual work was considered degrading.

Roy seemed glad to see him.

"Sorry I lost my temper." He smiled—his mother's intense, grave smile. "I don't like Selene. But she isn't important." His brown, quick fingers touched the gadget, and his gray eyes lit with eagerness. "I'm searching for a way to test the condensation hypothesis."

"Look, son," Kellon gestured impatiently at the window, toward the row of mighty black cruisers. "You don't have to play with abstractions. There's the Fleet, waiting for you to take command as soon as you are qualified. Your experiments should be left to underlings."

"I'm sorry, boss." Roy's tanned face set with his mother's unbreakable spirit. "I think my hypothesis is more important than the Fleet."

"Hypothesis?" Anger boomed in Kellon's voice. "Important." He tried to calm his tone. "Can you explain what is important about it?"

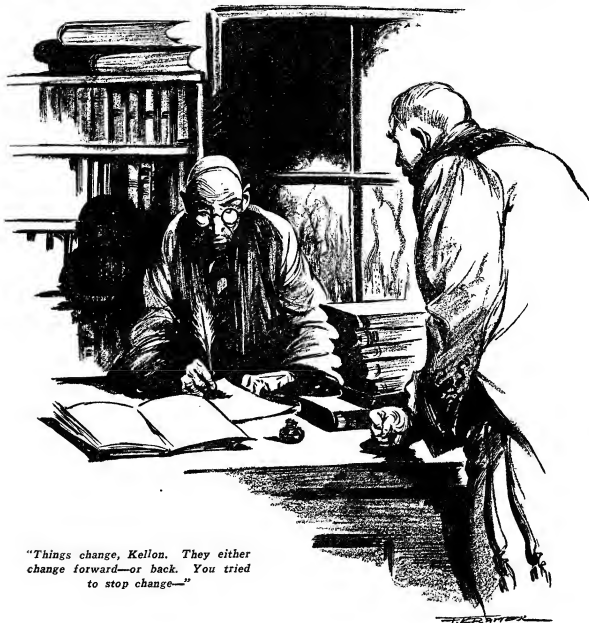
"I tried to, before I went to Mercury," Roy said. "You were too busy to listen. You see, I have a new idea about how the planets were formed. I went to Mercury to check it, with closer observations of the Sun. I believe I am right."

Kellon attempted to swallow his impatience.

"I'm listening, now," he said.

"You see, the origin of solar systems has never been well explained," Roy began in a careful voice. "The tidal theories of the twentieth century were all somewhat strained. There was a statistical difficulty. Only one star in a hundred thousand could possibly pass near enough to another to raise planet-forming tides. But the astonomers of the Outstation long ago convinced themselves that planetary systems are a lot more frequent than that."

"The discovery of the unitron, a hundred years ago, caused a revolution in nearly every science. It was recognized as the ultimate matter-energy unit of the universe. For the first time, it fitted all the various phenomena of electromagnetics and gravitation into a single picture. But most en-



*"Things change, Kellon. They either change forward—or back. You tried to stop change—"*

gineers, in the era of the Corporation, were too busy conquering and exploring the planets to devote much time to abstract theories."

Kellon felt a brief amusement at his son's simple lecture-room explanations, and then wondered uneasily if Roy knew that his degrees were forged. He frowned, trying to follow.

"The twentieth-century cosmogonists had to deal with a confusing array of concepts," Roy went on. "Electrons and protons, neutrons and mesotrons and barytrons, photons and light waves, electric fields and magnetic fields and momentum fields and gravity fields. Already they were beginning to grope for a unified-field theory, but they never quite perceived all those things as manifestations of the same ultimate unit. It's no wonder they never quite understood the Sun, or how the planets came to be born from it!"

"But you do?" Kellon was interested, in spite of himself.

Roy nodded eagerly, and touched the gadget again.

"I think I do," he said. "It is hard to believe that the existence of planets depends on a freakish accident. In my theory, a star forms planets as normally as it radiates energy. Even now, the Sun is emitting unitron mass at the rate of about four million tons a second. I believe that planets have been condensed out of emitted unitron matter, by a combination of several processes, over periods as long as the life of the stars."

Roy's gray eyes were shining.

"That is my hypothesis—that every normal star has formed planets of its own. The tidal theories allowed only a handful of habitable planets in the entire galaxy. I believe there may be—millions!" His quick hand gestured, with the gadget. "Of

course, it is still only a hypothesis—though the Outstation astronomers have found evidence of planets about several of the nearer single stars. But I'm going to find out!"

He searched Kellon's face.

"Do you see it, father?"

Heavily, Kellon shook his rugged white-wigged head.

"Your argument sounds reasonable enough," he admitted. "Once at the Outstation I saw a graph that had some little dips they said meant planets. But what of it? I don't see anything to get excited about."

Tears of frustration came into Roy's eager eyes.

"I can't understand it," he whispered bitterly.

"Nobody gets excited. Nobody cares." His bronzed head lifted defiantly. "But the engineers of a hundred years ago would have been building ships to explore those planets!"

"I don't think so," Kellon objected wearily. "It would be too far for commerce. The moons of Saturn haven't been visited for sixty years. Right now, our Jovian outposts are losing money. Supplies and transportation cost more than we get back. If it wasn't for Union prestige, I would abandon them today."

"Science has been slipping back, ever since the uranium process was lost." Roy's face was troubled. "I don't know why." His brown chin lifted. "But we can go on. The unitron drive can be improved. With time and money, I could build an interstellar ship!"

"Maybe you could," Kellon said. "If you are fool enough to want to die on some strange, barren world that men never even saw—when I have an interplanetary empire to give you!"

"I guess I'm just that kind of fool," Roy said quietly. "I don't want an empire."

Kellon lost his temper, then.

"I'm going to cut off your allowance," he shouted at the white-lipped boy. "That will stop this nonsense. Come to me whenever you are ready to take up militechnics."

"You had better go back to Selene du Mars," Roy told him, in a thin, low voice. "I don't need the allowance."

And that was true. Within a few months, Kellon learned that Roy had designed a new type drive-field coil for the unitron transports in the Jovian service. It saved three days in the long run out to Jupiter, and increased the power recovery in deceleration nearly forty percent. For the first time in twenty years, the Callistonian mines showed a tiny profit. Roy's fees, paid by the Union Transport Authority, were a hundred times the cut-off allowance.

In the five years since, Kellon hadn't seen his son. Roy had ignored an invitation he made Selene send. But he knew, through the Goon Department, that Roy was still at the old unitronics laboratory,

furiously busy with his research. Learning that his funds were running low, Kellon had ordered the Transport Authority to double the promised royalties. Roy had replied with a brief note of thanks.

Now, standing stunned and alone amid the whirling dancers under the green-glowing murals of the Neptune Room, Boss Kellon felt a crushing need to see that thin, determined face, that was so much like Ruth's had been.

But Roy had failed him. Under the burden of the tottering Union, he stood all alone. There was no other that he could trust completely. And Marquard's thin, frightened whisper goaded him back to face the present grim emergency.

"The Preacher's in Sunport," the distracted Goon chief repeated. "His followers already know. Mob gathering in Union Square." His lean shoulders shrugged, in a helpless bewilderment. "Delicate situation, your genius."

"Delicate, hell!" Kellon caught his breath, and decision flashed in his shrewd blue eyes. He had fought alone before, and he could again. "Search the drainage levels," he ordered crisply. "Arrest the Preacher."

"Is your genius sure—" Marquard blinked uncertainly. "He has terrific influence. Before he came, it might have been safe. Now his followers will make trouble."

"I'll handle trouble when it happens." Kellon stiffened his big shoulders, and managed to smile again. He must hide the black panic that swept him. "Don't kill him," he added. "Just bring him in. Martyrs are dangerous."

"Your genius commands."

The thin man turned nervously away, the frown of worry cut deeper in his dark face. The orchestra throbbed on—playing from a high platform whose glowing plastic decorations represented an ice cave on Triton, Neptune's once-visited moon. Kellon started back to Selene du Mars.

She was waiting, slim and tall in the flashing green sequins. Even her smile was hard and bright and beautiful. Kellon felt an eager little quickening of his pulse, for he still loved Selene. Then he saw that she was smiling for another man.

Admiral Hurd came striding across the crowded floor. Black-and-orange pajamas were cut to emphasize the broad triangle of his shoulders. He was young and tall and dark. His toothy smile flashed, and he greeted Selene by the militechnic title she claimed:

"May I, Miss Captain?" Then he saw that Kellon was approaching. A kind of wary alertness tensed his face, and the smile that erased it was a little too broad. "If your genius will allow?"

"Darling, you look tired."

Selene turned the white dazzle of her smile on him, and slipped into the dashing admiral's arms

before he could respond. Left alone on the floor, Kellon felt a tired envy for Hurd's youth and looks and vigor. Really, he was getting old.

He watched Hurd and Selene, dancing cheek to cheek. Her eyes were closed; her restless face seemed relaxed for once, and happy. But he caught a covert glance from Hurd's dark eyes, watchful, oddly hostile.

Turning wearily away, Kellon felt another surge of black regret for his son. If they had not quarreled, Roy might now have been in command of the Fleet, instead of Hurd. The new admiral was brilliant, and his record was clear, but Kellon didn't like him.

Kellon left the ballroom, escorted unobtrusively by his Goon bodyguards. He crossed the vast, silent Moon Room, to a terrace that looked down over Union Square.

It was night, and Sunport after dark was a view that had always stirred him. The towers were wide apart. Facades of luxion plastics turned them to tapering, graceful pylons of soft and many-colored fire. Their changing splendor lit the broad parks between, and stood inverted in a hundred pleasure lakes. The surface ways were broad curving ribbons of light, alive with the glowing cars of joy-riding engineers. A few pleasure gliders floated above the landing terraces, colored eggs of crystal light.

Sometimes, with an ache of longing, Kellon recalled his first rare glimpses of this bright and magical scene. For his childhood had been lived in the lower levels. It was only on infrequent holidays that he was allowed to come up into the parks, where he could see this forbidden, shining paradise of the engineers. \*

How mad his dreams had been! Ten million others must have dreamed them, but only he had come up to take the city for his own. Sometimes even yet the hard-won victory seemed altogether incredible. Nor ever had it been the pure untroubled delight he had dreamed of. Heavily, he sighed.

"Your genius!" The husky officer of the bodyguard stopped him in the wide arch of the terrace doorway, where drafts were checked only by a film of moving air. "The terrace may be dangerous—there's an ugly mob below."

"Thanks, major." He shrugged, and pushed on. He couldn't afford to yield to the fear in him. Confidence was his safest armor. "You know this is my favorite view."

But tonight the picture was grimly different.

The long rectangle of Union Square, below him, was gray with pressing crowds. From this elevation, the surging masses looked like some strange vermin, crawling about the bases of these mighty, shining, clean-lined towers that he loved.

Scores of bonfires glared, points of angry red.

His nostrils stung to a whiff of paper burning. Faint with distance, the angry buzz of voices came up to him. Evangelists were screaming hoarsely, and shrill voices sang. He caught a snatch from the "Battle Hymn of God":

*"Burn the books and break the gears!  
Kill Antichrist and engineers!"*

Kellon stood there a long time, until his sweaty hands set cold upon the shining rail. He was sick with a fear that all these glowing towers would crumble into that gray ocean of blind destruction. But Melkart said there was nothing left that he could do.

Suddenly his cold body jerked to a brittle clatter of automatic gunfire. A mile from him, at the end of the square, gray mankind was flowing like a queer, viscid liquid over the bright-lit surface way: Cars were seized and capsized in that live flood, like small, glowing beetles.

Tiny screams, reached him. Black Goon cars appeared on the shining pavement, and guns crackled again. It was too far to distinguish individual human forms, moving or dying. But the mass of the gray wave drew reluctantly back. The stream of traffic halted, and the light went out of the luxion pavement.

Anxiously, Kellon went back through the archway in the softly glowing wall—it was pulsating tonight with soft and slowly changing hues of violet and rose. He wondered briefly if quieter colors and a slower beat would seem more confident.

In the silent, cyclopean Moon Room, he hurried to the telephone desk. He dropped impatiently on his seat in the U-shaped slot, with the stereo prisms standing in a half circle before him. In the center screen, the bright image of the red-haired operator was a little smaller than life.

"Get me Marquard," he rapped. The girl nodded silently, and the dark, thin features of the Goon chief sprang into the next crystal oblong. Kellon couldn't keep the rasping tension out of his voice. "Have you got the Preacher?"

"Not yet, your genius," Marquard replied in his habitual jerky, nervous whisper. "Mob is getting ugly. Looted the park library and made fires of the books. Started smashing pleasure cars on Union Way. Had to kill a few of them, to rescue an engineer and his girl. Diverted traffic." His worried eyes blinked uneasily. "Maybe we ought to clean the square?"

"No," Kellon told him—it was good to be able to make one more sure and instant decision. "The dead ones are martyrs. Leave them alone. They'll howl themselves exhausted and go back to their warrens."

"I hope so," Marquard whispered faintly.

"Just catch the Preacher, and send him to me."

Kellon nodded at the operator, and the Goon chief vanished from the prism. "Reference Department." He spoke to a dyspeptic-looking female. "Show me the latest Goon report on the Preacher." The document was projected in the next screen.

Special Report No. 45-H-198  
Union Goon Office, Sunport, E.  
February 30, 1945

BY: Goon Operative GK-89 (R. A. Meyer, Politico-technic Engineer).

SUBJECT: Eli Catlaw, alias the Preacher of the Revelation, alias the Word of God, alias the King of Kings. Labor No. G-496-HN-009. Escaped convict, Mars Penal Reservation, No. 45-V-18. Wanted for murder of guard. Believed now in America, but whereabouts unknown. *Note: Catlaw is a dangerous character. Liquidation recommended.*

Tapping a key to change the pages, Kellon skimmed significant passages. "Catlaw was born in the Ozark District, of labor-class parents. . . . Mother's claim to illegitimate technical blood probably false. . . . Transported to Mars for assault on engineer. . . . Guard murdered, in escape. . . . Catlaw reached Venus Commonwealth on ore ship. . . . Became 'swamp walker' and successful herb trader. . . . 'Conversion' and preaching dates from recovery from attack of jungle fever. . . . Returned to Earth about nine years ago, to lead underground 'Crusade' against Union. . . . Enabled to evade many Goon raids by vast popular support. . . . Treason charges against Union factions. . . . Catlaw has incited assassination and sabotage. . . . His program implies total destruction of technical civilization."

Kellon finished the report. He sat staring into the empty prism, as gravely as if he could read there the end of Sunport and all his world. He had scarcely moved, an hour later, when Marquard brought in the Preacher.

Eli Catlaw seemed almost unaware of the burly Goons who gripped his arms. He was lank and tall in faded gray overalls, and he stood erect and defiant. His dark, hollow eyes stared arrogantly past Kellon, at the lofty luxuriant murals that illuminated the room. Kellon's shrewd eyes studied the man, against the background in the Goon report. Thick lips and high cheeks and stiff black hair showed Negro and Indian blood. The yellow face was long and angular and stern. At last the sullen, hostile eyes came back to Kellon's face, but obviously the Preacher didn't intend to speak first.

Kellon turned on his frank, confident smile.

"I'm glad to see you, Catlaw," he said smoothly. "I'm sorry if this is inconvenient for you, but it was the only way I knew to get your point of view."

The boss paused invitingly, but the Preacher said nothing. He stood absolutely motionless, between the big men who held him. His burning

eyes stared bleakly away, through the far, glowing murals.

"I know that times are difficult." Kellon kept his voice suave and even. "The exhaustion of the Jovian mines has caused depression. All the heavy industries are almost dead, and labor has naturally suffered. But I personally am deeply concerned for the comfort and welfare of the masses. And I assure you that the Union will earnestly consider any reform measures you will suggest."

Kellon paused again. Stillness whispered in the long Moon Room. Beneath the mighty glowing murals, that showed station domes and robot miners and long unitron transports against a background of towering lunar peaks and star-shot space, the little group at the telephone desk seemed queerly insignificant. The room seemed too vast for its builders.

Now at last the Preacher spoke. His long, stern face showed no response to Kellon's persuasive smile, and he ignored Kellon's arguments. In a tense, grating, stifled voice, he began quoting texts from the Revelation:

*"Babylon the great is fallen, is fallen, and is become the habitation of devils, and the hold of every foul spirit. . . . Alas, alas, that great city Babylon, that mighty city! for in one hour is thy judgment come."*

Kellon's smile had turned a little pale.

"Are you crazy?" He coughed against a troublesome rasp in his throat. "I suppose you mean Sunport?" His bewilderment was honest. "But Sunport is civilization!"

Stiff and insolent, the Preacher croaked:

*"He that killeth with the sword must be killed with the sword. . . . Therefore shall her plagues come in one day, death, and mourning, and famine; and she shall be utterly burned with fire. . . . In one hour is she made desolate. . . . And the light of a candle shall shine no more at all."*

Kellon leaned over the curving desk, with a look of earnest puzzlement.

"I don't understand you, Catlaw," he protested gravely. "Do you want to wreck all that men have accomplished? Do you want the future to forget the power of science? Do you want to turn men back into naked savages, and wipe out civilization?"

"Civilization?" The Preacher made a harsh, snorting laugh. "Your glittering civilization is itself the Harlot of Babylon, poisoning all that yield to her painted lure. The science you revere is your false prophet. Your machines are the very Beast of the Apocalypse."

He gulped a hoarse breath.

"Yea, Armageddon and the Kingdom are at hand!"

"Listen to me," begged Kellon. "Please—"

Catlaw jerked angrily in the grasp of the Goons. "I have come to destroy this last, most evil

Babylon." His metallic, pulpit voice rang through the long Moon Room. "Even as the angels of God once smote the wicked cities of the plain, Sodom and Gomorrah. And every engineer shall be burned with the fire of the Lord—save that he repents tonight!"

His yellow face was a stern, rigid mask. "I warn you, Antichrist. Repent tonight, and follow me." The cunning of the swamp trader glittered briefly in his hollow eyes. "Turn your power to the path of God, and I will receive you into the Kingdom. Tomorrow will be too late."

Kellon rose, gasping for breath.

"Listen!" His voice trembled. "I fought to rule Sunport. And I'll fight to preserve it from you and all the lunatics who follow you. Not just because it is mine. But because it is the storehouse of everything great that men have created."

"Then you are damned!" Scuffling with the Goons, Catlaw shook a dark, furious fist. "With all your city of evil."

Kellon's voice dropped grimly.

"I'm not going to kill you, Catlaw. Because you are probably more dangerous dead than alive, just now. But I know that you are a fugitive from the Union, with an untried murder charge waiting for you. I'm sending you to the Outstation prison, tonight, to await trial for murder."

He nodded at the Goons, and they dragged the prisoner away.

Kellon sat down heavily at the telephone desk. The Preacher unnerved him. It was hard for him to understand that deadly, destroying hatred, that blindness to all reason. But he knew that it was multiplied many million times in the gray-clad masses under the Union. He thought of the howling mob of the Preacher's fanatics about the foot of this very tower, and he was afraid.

But he must not yield to fear.

"Get me the militechnic reservation," he told the telephone operator. "The Admiralty Office. Hurd's at the ball, but I'll talk to the officer in charge."

The efficient redhead nodded, in the center prism. Kellon was astonished when the next screen lit with the dark, handsome features of Admiral Hurd, himself.

"Your genius looks surprised." Hurd flashed his easy, white-toothed smile. "But I left the ball, after one dance with Miss Captain du Mars. I had reports of this crisis, and I felt it my duty to be ready for your commands."

"Thank you, admiral." Kellon tried to put down an uncomfortable feeling that Hurd was far too alert and dutiful. "I have arrested the Preacher. His followers may try to set him free. I want a cruiser to take him to the Outstation prison, as soon as possible."

"At once, your genius. I was expecting duty,

and my flagship is hot. I'll take the prisoner myself. The *Technarch* will be on the Goon Office terrace, to receive him, in five minutes."

Smiling, Hurd flickered out of the prism.

Kellon felt another stab of sharp regret that Roy had failed him. But he had no time to dwell upon his dim mistrust of Hurd. For the empty prism lit again, with Marquard's worried features.

"Your genius, the people know we caught the Preacher." The Goon chief's whisper was nervous and hurried. "Mob in the square getting ugly. Fighting the Goon cordons. I'm afraid they will attack the Tower."

Kellon caught his breath, and tried to keep smiling. He felt confused and tired. He was afraid that any violent action would jar the human volcano under Sunport into terrible eruption.

But something had to be done. Some display of confidence was necessary, to help the morale of his supporters. He lifted his big shoulders, and groped for his old habit of instant decision.

"I'll talk to them," he told Marquard. "They can't all be as mad as Catlaw. I'll tell them who butters their bread." He smiled a little, as he turned to the operator. Any action made him feel better. "I'll speak from the terrace," he said, "on the Tower telephone."

"Wait, your genius," the Goon chief objected anxiously. "The terrace is dangerous. Automatic arms in the mob. Afraid the demonstration has support from some faction in the Union. My operatives still looking for evidence. Better keep out of range."

"I'll speak from the terrace," Kellon repeated.

Of course, he might be killed. Fear was a cold, crawling thing inside him. But he had faced death before. Now a display of perfect confidence was the best weapon he could use. He prepared to conceal his gnawing unease.

The touch of a key dropped the telephone desk into the lavatory below, a hall of glowing luxion almost as splendid as the huge Moon Room. Kellon adjusted the white toupee. A servant rouged his heavy jowls back to a cheerful glow. He tried to rinse the dry rasp out of his throat.

The elevator section lifted him back to the Moon Room. He walked back through the glowing luxion arch, to the lofty terrace. The telephone stand here had only two prisms. Standing between them, he could look down across Union Square.

Now the pavements had been darkened, all around the square. Surface traffic was stopped. That gray, human sea had grown until it overflowed the ways, to the shining bases of the towers beyond. The hum of voices had a lowered, vicious tone.

Kellon spoke to the operator in the prism beside him. The wall behind—and all the illuminated faces of the Union Tower—began to flash, red and



dark, red and dark, to gain attention. That ugly buzzing ceased, and he nodded. The crown of the Tower became a cool, steady violet.

"People of Sunport." From the three-hundred-foot screen in the wall beneath him, his giant image looked down over the mob. Magnified to the depth of thunder, his voice rolled out of a thousand speakers. "My friends, the action I have taken tonight was taken for your own good."

He trusted the old magic of his frank, robust smile and his candid, booming voice. After all,

"The Preacher has told you to destroy the machines." He tried to drown that defiant bellow. "He has told you to kill the men who create and control them. But think what you owe to machines—everything! Obey the Preacher, and the most of you will perish—"

*Brrram!*

A dull but mighty concussion rocked the terrace. Kellon glimpsed flying debris, spreading out in a giant fan from somewhere beneath him. Black smoke overtook it, and covered the mob in a bil-



*Kellon squatted in the shadows of the lowest levels while the mobs hunted—hunted for him!*

he had talked his way to victory over better men than Eli Catlaw. But that breathless quiet lasted only a moment, before the defiance of the mob rolled up to him at the slow speed of sound. It was a monstrous animal bellow.

"My friends, listen to me." At his quick nod, the operator stepped up the volume of that tremendous voice. "Listen to reason." A bullet slapped against the cold, glowing wall behind him. Stinging particles of plastic showered him. But fortunately the telephone picked up only a muffled thump. "What can you gain from the Preacher?"

Boos and jeers roared up from the mob.

lowing cloud. His knees were shaking, and his throat went dry. But he tried to go on:

"The most of you will perish—"

But the amplifiers were dead. His natural voice was wholly lost in the blasting echoes that came rolling back through the smoke from the distant towers. The telephone was out of order. Even the operator's image was gone. He shouted hoarsely at it, and clicked the call key. But the prisms remained empty.

He stood clutching the edges of the stand. He felt bewildered and ill, too dazed even to wonder actively what had happened. At last the smoke

came up about him, in a choking, blinding cloud. He stumbled back into the Moon Room.

"Your genius!" Frightened members of the bodyguard met him in the doorway. "Are you hurt?" The officer told him: "It was a bomb. Under the giant screen. Spies must have set it."

The telephone in the Moon Room was still working. Kellon dropped weakly in his seat in the slot, with a grateful smile at the white-lipped operator. He told the redhead to call the Goon Office. Marquard answered, his jerky whisper briefly relieved:

"Afraid they had got you, boss." Alarm came back to his thin, dark face. "Thing is worse than I thought. Widespread plot. Organization. Probably Preacher is the leader, but engineers were in it. Got surprising quantities of arms and explosives, and experts to use them."

Kellon managed a hard, little grin.

"Evidently it isn't sinful to use machines—when they're guns."

The Goon chief was too harassed to smile.

"Watch for your life, boss," he whispered. "Warn your guards. May strike anywhere. Rioters smashing cars and storming buildings and murdering engineers, all over the city. Union Tower may be next."

Kellon drew a long breath. His shaken nerves were recovering from the blast.

"Chin up, chief!" His rouged smile was easier. "We'll handle things. I'll call Hurd, and have him stand by with the Fleet. We may need a few tons of tickle powder dropped out of space. There's nothing like a couple of hundred thousand tons of long, black unitron cruiser to instill respect." He turned to the watchful redhead. "Get me the *Technarch*."

The operator nodded. Her head bobbed a little in the prism, as her unseen hands sped over the switchboard. But the next prism remained blank. A puzzled expression came over her tense face. At last she told Kellon, "Your genius, the *Technarch* doesn't answer."

Icy, unreasoning panic clutched Kellon's heart. "Get me the Admiralty Office."

A dazed-looking militechnic cadet informed him that Admiral Hurd had taken the entire Fleet into space. "All the ships had been hot for twenty-four hours, sir," he stammered. "I understand the annual maneuvers are taking place, off the Moon."

Kellon made a stunned little nod, and the startled cadet was cut off. He stared at Marquard, still imaged in the adjacent prism. The Goon chief had seen and heard the cadet, and his lean, furrowed face reflected Kellon's consternation.

"The maneuvers were not to begin for a week," Kellon gulped uneasily. "Hurd shouldn't have begun them without an order from me." He shook his cragged head. "But—wholesale mutiny—it's too appalling to think of!"

Marquard made a tiny, bleating sound.

"That explains it, your genius," his whisper rasped. "Arms. Organization. Experts. Evidence that the Preacher had help from in the Union. He was plotting with Hurd." His pale face looked frightened. "Looks desperate, boss!"

"I won't believe it," muttered Kellon. He didn't dare believe it. Anxiously he told the tense-faced redhead, "Get me the Outstation. Manager General Nordhorn. At once."

The Union's supremacy—and his own—depended on control of space. To that end, the Fleet and the Outstation were equally essential. That artificial moonlet was scarcely a mile in diameter, but an often-proved proverb ran, "The master of the Outstation will be master of the planets."

The tiny metal moon had a twenty-four-hour period, which kept it swinging always to the south of Sunport's zenith. At first it had served merely as observatory, laboratory and stepping-stone to space. But the militechnic engineers of the Commonwealth, the Corporation and the Union had thickened its massive armor of meteoric iron, until it was the Gibraltar of the system. The theoretical range of its tremendous guns extended around the Earth and out to the Moon.

"Hurry!" Kellon croaked. Breathless with impatience, he watched the red-haired operator. She fumbled with her unseen controls, as if there was some difficulty. But at last Nordhorn's thin, dark face flashed into the prism.

Manager General Nordhorn was an old man, bent and yellowed and deaf. He should have been retired years ago. But few younger men had shown steadfast loyalty—and even those few, like Marquard, were usually of indifferent ability. Something had happened to the fine tradition of the militechnic service.

"Has Hurd arrived?" Nordhorn cupped a trembling yellow hand to his ear, and Kellon shouted: "I have arrested the Preacher. I sent Hurd to carry him out to prison. He took the Fleet to space, and he doesn't answer the telephone. There may be trouble. Better call your men to action stations—"

Kellon's voice died up. Nordhorn had looked sternly composed. But now, as he gulped to speak, Kellon saw the evidence of desperate emotion in his bloodless cheeks and his thin, quivering lips.

"Your genius, Hurd has already called." His voice quavered, uncertainly. "I was just about to call you. Hurd did not mention any prisoner. He delivered an ultimatum. A shocking thing, your genius—I can't quite understand—he demanded that I surrender the Outstation!" Nordhorn's yellow Adam's apple jerked, as he swallowed. "Your orders, sir?"

Blood drummed in Kellon's ears. Cold with sweat, his hands clutched the edges of the desk. In spite of all the evidence, the completeness of

this disaster was still incredible. He tried to steady his reeling brain. Hoarsely he ordered:

"You will defend the Station—to the last."

"To the last." Nordhorn's white head lifted proudly. "But the situation is desperate, sir." A stunned bewilderment came back to his face. "I can't understand—things are happening so fast. But mutiny is reported in some of the gun crews. Men are fighting in the spaceward bays now."

"Hold out—" begged Kellon. But suddenly the haggard-faced old general was swept out of the prism. He clicked the call key desperately, and shouted at the operator, "Get back Nordhorn!"

"I'm sorry, your genius," the tense girl told him. "The Outstation doesn't answer."

Marquard's sick, shaken face was still in the other screen. For his benefit, Kellon tried to grin. "So Hurd and the Preacher are in bed together?" he muttered. "Which do you say will manage to kick the other out?"

"Won't matter, if the Station falls," rasped the Goon chief's hasty whisper. He listened. "Excuse me, your genius. The riot bureau is calling me. Remember—watch your life!"

His image was gone. Aimlessly, Kellon stalked up and down the pale-glowing luxion floor of the long Moon Room. What next? The news from the Outstation had shaken him more than the explosion under the terrace. He felt numbed and ill. Still the Station didn't answer, and he knew nothing useful to do.

The ball was still going on in the Neptune Room, the officer of his bodyguard told him. Even the telephone newsmen had as yet received little hint of the real gravity of the situation. The bright-clad dancers didn't know that their world was at the brink of catastrophe.

Perhaps that was the trouble. If the engineering class had danced less—if they had learned more and done more about the other nine-tenths of the population—things might have been different. But Melkart said it was three generations late to think of that.

"Boss!" a guard shouted. "Look out!"

Shots echoed against the high, glowing murals. Somewhere a woman screamed. Fighting men surged through the wide arch from the Neptune Room. The lights went out in the luxion panels. An automatic clattered in the dark.

The broad connecting doorway had been closed only with the sound-absorbing air screen. Now Kellon heard a muffled *woosh!* The armored safety panel had lifted, but too late. The attackers were already in the Moon Room.

In the faint glow that came through the terrace arch, he glimpsed crouching, darting figures. An arm threw something over the fighting Goons. It crashed beside him. Desperately he groped for

it, hurled it toward the far end of the room, dropped flat behind the telephone desk.

His ears rang, and the immense dark room was alive with screaming metal. He rose behind the desk, snatching a hidden automatic from under the seat. But the shooting had stopped. Light flowed back into the high luxion murals.

Three men were lying still inside the closed archway. One made a thin, whimpering sob, and a frightened Goon fired a final shot into his head. The officer came running anxiously to Kellon.

"Is your genius all right?"

Kellon managed to grin.

"Attempt No. 17." He was glad of the rouge on his face. No other attempt had ever come quite so close, or made him feel so weak inside. He dragged his eyes away from the ruin at the end of the room, where the bomb had shattered a cragged lunar peak into dusty rubble. "Who were they?"

Already the Goons were examining the three dead men. Their fingerprints were swiftly identified by telephone. One of them proved to be an hereditary engineer, who had failed in the examinations for a practical militechnic degree. The other two were members of the auxiliary white-collar class.

"The engineer must have come with the guests," the guard officer reported. "The others were among the musicians. They had guns and the bomb in instrument cases." He caught his breath. "I regret this terribly, your genius. But let me congratulate your personal courage, with the bomb."

Courage! Kellon shrugged and turned quickly away from the still figures in their gay blood-stained rags. There was already an odor. Death made him ill. If he had been an instant slower—desperation wasn't courage. His voice came harsh and loud:

"Get them out and clean the floor." Then he thought of Selene du Mars. Concern sharpened his tone. "There was fighting in the ballroom? Was anyone hurt? Find out if Miss Captain du Mars was hurt."

The safety door dropped again. Anxiety made him follow the questioning Goons. An ominous, hysterical tension met him in the vast green-glowing Neptune Room. Cold-eyed officers were grilling the frightened musicians. Half the guests were gone. The rest were gathered in pale-faced groups, chattering nervously.

He couldn't find Selene. The guards at the main entrance, off the public glider terrace, had not seen her among the departing guests. But she had vanished early in the evening.

Apprehension seized him. In spite of her scheming ambition—or even because of it—he loved Selene. He knew that the Preacher's followers

hated her savagely, as the very symbol of all that was denied them. She might be abducted, perhaps even murdered.

He hurried back to the telephone in the bomb-shattered Moon Room, and called her suite on the floor below. The dark Eurasian major-domo said she had not come in. But the red-haired operator told him:

"Your genius, there's a recorded message from Miss Captain du Mars. It was left two hours ago, to be delivered whenever you called for her. Will you receive it?"

Kellon nodded, suddenly voiceless.

Selene's face came into the crystal block. The fire diamonds burned in her platinum hair. Their changing blaze went blue as her clear eyes, and redder than her lips. Her voice came, cool and hard and perfect.

"Harvey, I am leaving you tonight. We shall not meet again. This is to thank you for all you have given me, and to tell you why I have gone. It isn't because you are getting old, or because I think you are slipping—believe me, I wouldn't go because of that. But I'm in love with Admiral Hurd. By the time you hear this, we shall be in space together. I'm sorry, Harvey."

Kellon sat for a long time at the telephone desk. He felt numb and cold. In a hoarse voice, he told the operator to run it over. Selene smiled again, and wiped away the same solitary jewel-bright tear, and spoke the same gem-hard words.

She lied. Kellon stared blankly at the mural the bomb had shattered—his own life was darkened and broken, like the luxion panel. He clenched his fists in a sick and useless fury. Of course she lied!

Maybe she did love Hurd. The traitor had looks and youth. That would be no wonder. But it wasn't love that made her go with him. He knew Selene too well to accept that. She had gone with Hurd because she expected him to be the next master of the world.

"Run it again," he told the operator. "Without the sound." And he greeted the silent image with a tired, bitter grin. "Good hunting, Selene," he whispered. "After all, we've had our day. Good hunting—but you and your dashing admiral had better watch the Preacher!"

The lone tear fell, and she vanished once more.

And presently Kellon told the operator to try the Outstation again. Selene wasn't everything. Tonight the world was at stake. His life, and hers. The Union, and Sunport. The game was being played, far out in the silent cold of space. Between an old man's loyalty and a young one's ruthless ambition. Between the old world he had conquered and one unknown. He could only wait for the issue. There was nothing else to do.

But the Outstation didn't answer.

"Nothing, your genius," the operator said. "There has been nothing from space since General Nordhorn was cut off."

Wearily restless, Kellon rose from the desk. The dead men had been taken away. But he thought that the faint, sickening smell of death still hung in the room. He felt cold, and his big body was hunched with tension. And he felt desperately alone.

Then he thought of Melkart.

The old philosopher-historian was one man who ought to know what was happening to Sunport. Often in the past his somewhat Machiavellian advice had been useful. Almost before Kellon knew it, his restless feet were taking him through the Saturn Room.

That immense hall was his library. Books walled it, four galleries high. Vaults beneath held microfilm copies of all known literature. Kellon left his guards outside the historian's office.

Charles Melkart occupied a tiny alcove. The white-glowing walls were bare, but one huge window gave a spectacular view of the shining, night-cloaked city. A huge, ancient, wooden desk took up nearly half the room. It was piled untidily with books and stacks of manuscript.

As if unaware of any trouble outside, Melkart sat behind the desk, writing swiftly with an old-fashioned pen. He was a small, stooped man. He wore a wrinkled lounging robe. A red wool skullcap covered his baldness. He blinked as Kellon entered and took off his spectacles. In his wizened, yellow face, his eyes looked strikingly young and alive.

"Sit down, Wolfe," Melkart never fawned. "I was expecting you."

Wolfe! That had been Kellon's party name. He remembered secret meetings, down in the drainage levels, where the cold walls sweated and the air was alive with the throb of pumps. That was in the old, dangerous days, before they gave up the fight for the forbidden ideals of democracy.

Suddenly Kellon wondered if Melkart and Ruth had really been in love. He dismissed the thought. That hadn't mattered, for many years. The New Commonwealth was a forgotten dream. Melkart had left his idealism, with his health, in the carnate mines of Mars. And the parole had settled whatever debt there might have been.

But Melkart had given him a great deal—besides Roy's mother. The lean, brilliant New Zealander had taught him the science of politics. His degrees had been forged at the party headquarters, to make him a more useful agent. When the Corporation shattered the underground organization, Kellon had managed to escape with most of the party funds.

Kellon had attempted to repay him with some high position in the Union. But the sardonic ex-radical declined to accept anything more than the

needs of his simple life, and use of the vast library in the Saturn Room.

"You have made the solar system into a laboratory for the test of my politicotechnic theories," he said, with his thin, yellow grin. "Now all I want is time to finish writing 'Destiny.'"

Now, when he came into the scholar's narrow room, Kellon was too perturbed to take the single chair beside the cluttered desk. He walked to the great window. The rioters made a gray, uneasy sea below, flecked with the scarlet of fires. A distant explosion jarred the air; a machine gun rattled; the drone of voices lifted angrily.

Melkart picked up his pen to make some hurried note.

Pale and tense, nails biting into his palms, Kellon turned back from the window. In a hoarse, desperate voice he asked the lean old man at the desk:

"Charles—do you know what is happening to Sunport?"

The red fez nodded.

"I've known for thirty years," Melkart grinned, with owlish assurance. "Old Giovanni Vico had a glimmer of it, with his 'law of cycles,' back in the seventeen hundreds. Spengler and Toynbee glimpsed it. Sprague, later, saw farther. But it remained for me to reduce the laws of the rise and fall of human cultures to the exact science that I call *destiny*." His yellow, clawlike hand gestured quickly at a huge manuscript. "Here, in my last volume—"

"Listen!" Kellon's fist banged the desk in interruption. "I've no time for books. The gray class is rioting. The Fleet has mutinied. The Outstation is under attack—if it falls, we'll be bombarded from space. Already assassins have attacked me once tonight."

He made a harsh, mirthless laugh.

"Books! Can you sit here writing a book, when the Preacher's fanatics are burning libraries in the park? They are murdering every engineer they can lay hands on. Who will be left to read your precious book?"

Melkart's fleshless, yellow visage grinned.

"Nobody, I'm afraid," he said slowly. "It is tragic that cultures must reach the point of breakdown before they can breed men able to understand them. But lack of understanding does not change the truth. Every fact you mention is inevitable. Because now Sunport is dead—a petrifact."

"Petrifact—you're insane!" Kellon slammed the desk again. "This is no time for your pessimistic theories. I want to know something to do." His voice sank, pleading. "You have helped me before. There must be—something."

Melkart closed a big book, and Kellon saw that the yellow fingers trembled.

"You and I are finished, Wolfe." His voice was

slow and regretful. "Because the soul of Sunport is dead. You see, a city or a nation or a culture is something more than the sum of the individuals that make it up. Sunport was born, back in 1978, when the first rocket blasted off Toltec Mesa. It was created to conquer space. It did, and that supreme victory made it the greatest megalopolis the world has seen."

"That's history," Kellon muttered impatiently. "What's the matter today?"

"Space is conquered," Melkart told him, "and that great idea is dead. Because life doesn't stand still. Disused functions are lost. After the victory was won, Sunport failed to discover a new purpose to keep her alive. Therefore, she died. It makes no difference that ninety million new barbarians live on in these dead towers."

Kellon had moved to speak, but Melkart added sardonically:

"That's as true of you, Wolfe, as it is of the city. You aren't a tenth the man you were thirty years ago, when you set out to smash what was left of the Corporation. You might have been a match for Eli Catlaw—then."

Kellon smoothed a frown of displeasure from his face.

"Please, Charles," he begged. "I know I'm getting old, but the Union is mine. Maybe I got it by arbitrary methods, but it is a trust. I've got to save it from the Preacher and his rabble, because the Union has created everything we call civilization."

"True." Melkart's red-capped skull nodded gravely. "The engineers were a creative minority—a hundred years ago. A small group of experts conquered space—and thereby created more wealth than mankind had ever owned before."

"Inevitably, the creative power of the engineers resulted in political dominance. Unfortunately, however, they have ceased to create. Now their spendthrift children merely loot the wealth their fathers earned, and play their silly game of hereditary degrees. And Sunport is as much a petrifact as the pyramids of old Egypt."

Kellon leaned over the untidy desk.

"Sunport is mine." His rugged face was pale under the rouge, and his low voice trembled. "I paid for it, with brains and toil and years. I worked and schemed and bribed and robbed and lied and killed. I lived in dread of assassination. I fought like a jungle animal for the city." He gulped a rasping breath. "I won't give it up."

"You said that," Melkart smiled his wry, yellow smile, "but you help establish my proposition. Because you completely fail to share the magnificent aspiration that created Sunport. Out of these restless millions of new nomads, you merely had superior cunning and audacity and luck."

"But men want to merge themselves in things greater than their individual lives. Destiny is

the word I use, for those supernal living forces that exalt and give purpose to the lives of myriads.

"Sunport has fulfilled her destiny, and thereby lost it. But the Preacher has offered these new barbarians another destiny—a fresh, common purpose—that is on their own savage plane. That means that our world has ended, Wolfe."

Kellon stared at him silently.

"You're lost, Melkart," he said at last. "You will still be sitting here, when the Preacher's fanatics come along to burn your book and cut your throat. I think that is the best criticism of your philosophy"—he swung aggressively toward the door—"but I'm not done."

Kellon went back to the bomb-torn Moon Room. Perhaps Melkart was right. Perhaps Sunport was doomed. But he wasn't ready to die. He sat down anxiously at the telephone desk, and told the operator to call the Outstation once more.

"I'll try, your genius." The girl was pale and

jittery. "But I've been trying. They don't answer." Her voice was near hysteria. "The whole telephone system is breaking down. They have been smashing equipment and murdering operators."

"Get the Outstation!"

His voice was harsh with strain. He sat watching the busy girl. Unrest held him tense, but there was nothing he could do. The minutes dragged. There was no reply from space, until a terrible screaming came out of the sky.

The tower shuddered. A monstrous, bellowing vibration drowned all thought. The floor pitched. Concussion jarred Kellon's bones. The high luxion murals flickered and went dim. The plastic mosaic of a moon city turned black and came crashing down. The air was filled with choking dust.

The bombardment had begun.

No need to get the Outstation now. That first terrible projectile from space was enough to tell him that Hurd and the Preacher were victorious.



*No one recognized the grimy man as Boss Kellon.  
Just a laborer straining at blocks of broken stone—*

The Outstation had been taken or destroyed.

Support was defenseless. True, there were huge batteries on the militechnic reservation, beside the spaceport. But, hampered by Earth's gravitation and the atmosphere, they were almost useless against attack from space—even if the plotters had failed to put them out of commission already.

Kellon shivered to something colder than personal fear. For he knew that Melkart was right. This was the end of Support. The Union was finished. The engineering class was doomed. Ahead he could see only ruin and chaos, ignorance and savage cruelty, darkness and despair.

"Get me Marquard!" he shouted at the frightened operator.

Now the Goon Department was the last feeble defense of civilization. But Support must be blacked out. The people must be warned to leave the city or take refuge on the lower levels. And he wanted to know where that first projectile had struck.

The Goon chief's head came into the crystal block. But it was sagging wearily back. Marquard's apprehensive frown was at last relaxed. There was a little dark hole at his temple. The operator made a tiny, stifled scream, and the peaceful face vanished.

"He's dead!" She listened, and began a tight-voiced explanation. "The office says he shot himself, when he learned—"

The second projectile cut her off.

The Union Tower shuddered again, like a giant live thing struck with some deadly harpoon. Concussion flung Kellon out of the seat. He was deafened, and the salt sweet of blood was on his lips.

He climbed back to the desk. But the operator's prism was blank. The dial lights were out. Frantically he jiggled the call key, but there was no response. The instrument was dead.

His ears ceased to ring. Suddenly he felt that the huge shattered room was queerly still. He shouted anxiously for his guards, but there was no reply. Peering into the dust, he saw that the officer lay motionless under a pile of rubble, in the broken archway. The others had fled.

He was alone.

Alone! That realization was appalling. Now the breakdown was complete. No longer was he boss of the Union. He was merely one among millions of frightened and bewildered human beings. The only order left was the organization of his enemies.

In his dazed aloneness, he was scarcely aware when the third projectile fell. But the light flickered, in all the luxion walls, and went out. He cried out, in the smothering dark. An ulti-

mate purpose was awakened in him—the blind instinct for survival.

A dim glow from without guided him to the terrace. He saw that half the city's towers were still pulsating with the changing radiance of their luxion facades. The bombardment soon would black them out, he thought bitterly, forever.

Union Square was almost empty. A few stragglers of the gray mob still fled across the darkened ways. Near the base of the Tower, dust and smoke drifted out of an immense dark crater.

So near! Kellon shivered to a cold realization. The Union Tower was the target. The space bombardment was aimed at him! Because, by now, he was almost the last symbol of the Union's shattered power.

He ran back through the archway, to the roof elevator. Its luxion walls still glowed, and it shot upward when he pressed the controls. He stumbled out into a chill night wind, on the penthouse roof.

"Here!" he shouted, across the glider terrace. "Quick—haul out the *Ruth*!"

Then he saw that the terrace was deserted. The hangar yawned black and empty. The long crystal bubble of his unitron glider was gone. The crew must have fled with it when the bombardment began.

Kellon stood bewildered in the cold dark. He sobbed, and his fists were clenched impotently. The world had crumbled under him, and there was nothing he could do. Civilization had dissolved.

The fourth projectile came nearer still. An appalling vibration battered him. He dropped flat. The deck quivered, like part of a monster animal dying. The concussion stunned him.

He came to himself in the elevator. Its luxion walls were black. He fumbled in the dark for the controls. But the mechanism was dead. He flung himself into the dark emergency stair, and started running down the steps.

Presently, he supposed, when those guns in distant space had found the Tower's range exactly, the projectiles would come in salvos, instead of singly.

The black stair was endless, and his descent became a blurred nightmare. Blast followed blast, until he no longer tried to count them. The concussions were shattering blows against his very sanity.

Down and down, through dust and darkness. Once he tripped over something that felt like a body, and fell until a landing stopped him. His muscles jerked with fatigue. Stiff blood dried on his bruised temple.

Somewhere there were levels where the walls still glowed dimly. It was part of the administrative offices of the Union, for he glimpsed floor after floor covered with identical unending rows of glass cubicles and telephone desks and business

machines. The mob must have been here, for he saw scattered bodies of Goons and grays. But the living had fled.

Still his numbed brain could function, in a disjointed way. For he realized that his bright dress pajamas would be a sure warrant of death, when he came down to the levels where the Preacher ruled. He stripped a gray-clad body, pulled the coarse garments over his own, and threw away the white toupee.

Sometimes black panic blotted out all awareness. Fatigue became a drug that destroyed memory and sensation. But he kept on his feet. He kept moving. Because he didn't want to die.

There was another stratum of darkness. Then somewhere he found an elevator that worked. It dropped him into the damp chill of the drainage levels. The concussions were now muffled with hundreds of feet of earth. But still they struck and struck and struck, numbing clubs of death.

Once he came to himself, and found that rubble had almost buried him. An air tube had caved above him. He dragged himself stiffly out of the debris. No bones were broken. He stumbled on. It was a long time before he realized that the bombardment had ceased.

A burst of automatic fire crashed out of a dark crossway. He ducked for cover. But a heavy, bloodstained man in gray lumbered into the pale, cold light of the tin luxion tube strung along the roof, and covered him with a Goon automatic.

"Halt, for Armageddon is at hand!"

"Yea, Brother!" Kellon managed to respond with a dazed quotation from the Preacher. "And the Kingdom is come."

"Pass, Brother." The man grinned at him, redly, and explained: "I am hunting engineers. I've killed seven." Kellon was about to pass, when the gun moved ominously. "Wait, have you heard the news?"

Kellon waited.

"Admiral Hurd tried to trick the Preacher." The red hunter chuckled triumphantly. "He was slain by the hand of God—and a well-flung knife. Now the Fleet is ours—if any ships are left, for they were last reported fighting one another."

Kellon's throat was suddenly dry.

"Selene—" he whispered. "What about Miss Captain du Mars?"

"Forget those words of Satan, Brother." The hunter licked his lips, with an unpleasant relish. "The harlot of Babylon is also dead. They say that she betrayed even the Antichrist, in the end. She was found with Hurd, aboard the Fleet. She took poison when he was killed, to escape the Preacher's wrath. Hallelujah!"

"Praise the Lord!" Kellon gasped hoarsely. "Good hunting, Brother."

He was sorry to learn of Selene's death. Yet he

was certain that she had wasted no pity on herself. She had played the game to the end, by her own hard rules. The possibility of failure had been taken into her calculations, equally with success. The poison she had ready was proof enough of that.

Shock and bewilderment and fatigue made a black fog upon his mind. It was hard to remember what had happened. Hard to understand it. Like Selene, he had played by the rules that life had taught him. But now they no longer applied.

Once he hid from a mob that came splashing along a dark tube. They had flaring torches. Their leader carried a woman's head on a stake. They were singing the "Battle Hymn of God."

Dimly, he tried to understand what had turned human beings into such frightful things. Of course, the rule of the Union had been a heavy burden, but he remembered signing many measures for the relief of the masses. Melkart, he remembered, said that he was three generations late.

It was twenty years since Kellon had felt the wet chill of the drainage levels. But suddenly the last secret meeting of the New Commonwealth party seemed only yesterday. This intricate maze of dripping tunnels remained as familiar as if he had never left it.

Reeling to his burden of fatigue, he found a little niche that he had dug long ago in the side of a shaft above a drainage pump. He slept for a long time, and woke staring at the even marks of his drill still visible in the damp sandstone.

It gave him a curious and surprising pleasure to see that evidence of the old strength and skill of his hands. For it was a long time since he had even dressed himself completely without some aid.

He was hungry, but still the far past served him. He climbed, by a way he had known, to the freight levels. Traffic had ceased. He saw no Goons or workmen. In most sections, only a few pale emergency lights were glowing.

A few other looters were busy. He avoided them. Presently, he found a wrecked electric truck, and loaded his gray pockets from its cargo of hydroponic oranges and tinned imitation beef. He ate, and cached what was left in the little cave.

It was dawn of the second day when he came up a sloping freight ramp, into the tangled weeds and rusting metal and time-dulled luxion masonry of the long-abandoned Saturn Docks.

He was searching for his son.

It was five years, now, since their quarrel. He couldn't be sure that Roy would want to see him. But the bright shadow of Selene was no longer between them. He was lonely, and Roy was all he had left.

If his Tower had been the brain of the Union, the spacecraft had been its pulsing heart. Remem-



bering the great batteries on the militechnic reservation, he hoped that refugees from the bombarded city might have gathered here, to make a last defense upon the natural fortress of the mesa.

Eagerly, he pushed through the weeds toward the Venus Docks. Stumbling in the dim early light, he came upon a new mountain of fresh black earth and broken stone. The heart went out of him. He climbed wearily to the summit of the shell-built ridge.

Beyond, where the busy Venus Docks had been, was only a wide black chasm. Bitter fumes stung his nostrils. But it was more than the explosive reek that blurred his eyes with tears.

Chaos met him. The shell-torn mesa looked desolate as the crater-pitted Moon. Outside the Saturn Docks, scarcely any familiar structure was even a recognizable ruin. Death had plowed deep. Only a few twisted scraps of metal even hinted that docks and cradles and ships had ever existed.

Miles away, on the rough field of dark debris where the militechnic reservation had been, he saw a fallen cruiser. All the stern was gone, as if the magazine had exploded. The plates still glowed with red heat over the battery rooms, and smoke lifted a sharp thin exclamation point against the gloomy sky.

Sadly, he recognized the *Technarch's* lines.

Beyond the dead ship, Support was burning. A terrible red dawn glowed all across the east. But the low sky overhead remained dark with smoke from the conflagration. Hours dragged on, as he searched for the ruin of the unitronics laboratory where Roy had worked. But the Sun didn't rise.

It must have been noon when he came to what was left of the laboratory. Hope ebbed out of him, when he saw the shattered ruin of the dead luxion walls. For the old building had been directly hit.

A huge, yet-smoking pit opened where the left wing had been. The roof was torn off the massive gray walls. They were banked high with debris. It seemed impossible that anybody could have survived, in all the building.

"Who comes?"

Kellon whirled, startled. Behind him, a big man had risen silently from behind a mound of rubble. The labor number printed across the front of his gray overalls showed that he had been a dock worker. He carried a stubby automatic rifle.

"Steve Wolfe." Cautiously, Kellon answered with his old party name. "Freight handler."

"What do you want?"

"I'm looking for Engineer Roy Kellon," he said desperately. "I have a message for him. He worked in the unitronics lab. Do you know him? Was he hurt?"

The big man made no immediate reply. His keen eyes studied Kellon over the level gun. Puzzled and impatient, Kellon kicked uneasily at a

bomb-tossed stone. At last, as if he had reached some decision, the guard nodded.

"I think you'll do. Come along, and I'll let you talk to Tom Pharr." He pointed with the gun toward a gap in the shattered wall. "Roy Kellon is here," he added, "but you will find it hard to deliver any message right now. Because he is buried under a thousand tons of rock."

Kellon walked ahead, through a maze of ruined rooms and roofless passages. He heard voices and the muffled clink of tools. Abruptly, his guide brought him upon a surprising scene.

A cracked, unroofed wall inclosed a long rectangle. It was piled deep with broken rock and debris, flung from the crater where the other wing had been. But scores of men and women were toiling desperately to move the rubble. They had half uncovered a long, mirror-bright torpedo shape. The guard hailed a slim young man in gray, who appeared to be in charge of the excavation.

"Pharr! Here's another man for you."

The slim youth came to meet them. Kellon knew him. He had seen him here at the laboratory when he came to beg Roy to give up his research. But his face showed no recognition, and Kellon was glad of it.

"Refugee?" Pharr asked quickly. "You don't like the Preacher? You want to leave Support?" Kellon scarcely had time to nod. "Are you willing to go to space?"

"I am," Kellon felt bewildered. "But I was looking for my . . . for Engineer Roy Kellon. Is he all right?"

"He's aboard the *Nova*," Tom Pharr jerked a hurried thumb at the half-buried torpedo. "He'll be all right—if we can get him uncovered before the Preacher's fanatics get wind of us."

"That?" Puzzled, Kellon nodded at the bright spindle. "A spaceship?"

"Interstellar cruiser," Pharr explained swiftly. "We've been working on it, for years. It was almost ready to test. When the bombardment started, Roy tried to get it into space. The shell caught him."

"Lucky I was in the city—trying to find a crew. I got back in a glider, after the bombardment. I've been collecting refugees to dig him out." His quick eyes ran over the busy scores. "We'll save a tiny seed of civilization—if we get away."

Pharr's lean face betrayed faint worry.

"Some damage to the *Nova*. But Roy signaled that he is making repairs. Expects to be able to take off, as soon as we can get it uncovered. There's fuel enough for Venus or Mercury. But we'll have to find dynodes and supplies for the interstellar flight."

Eagerly, Kellon echoed, "Interstellar?"

Bright enthusiasm burned all the fatigue from Tom Pharr's face.

"Roy believes every star has planets of its own. Won't matter so much if dark ages come to Earth. Because we and our children will be sowing the seed of mankind across the stars." His intense eyes peered at Kellon. "Want to sign for the voyage?"

Kellon gulped in vain to speak. This was something more than a chance to escape the chaos of a crumbling world. Tom Pharr's quiet, brief words had painted a new vision, suggested a new purpose. He nodded mutely.

"Then get to work."

Kellon went to help a man and a girl who were trying to roll a raw new boulder away from the *Nova*. It was queerly comforting to be accepted as a member of this busy, efficient group. Never before had he quite realized how lonely the boss had been.

As the hours went on, he was scarcely conscious of fatigue. He wasn't much concerned with the blood that presently began to ooze from his soft, uncalled hands. There was time for only a few brief words, but he began to feel an eager interest in these new companions.

A curiously assorted group. Burly dock hands in gray. A few young cadets who had survived the destruction of the militechnic college. A dozen veterans who had escaped from the Outstation in a life tube, when it was blown up. Engineers, white-collar workers, servants, grays.

But their one intense purpose had fused them all into a single unit. Class distinction was gone. Kellon noticed a pretty girl, in low-cut dance pajamas. She looked a little like Selene du Mars. But she was serving soup to a line of hungry stevedores in gray.

Melkart's dictum came back to him. Sunport was dead, because it had lost the purpose that created it. But this desperate, tattered little group was still somehow a vital entity. Because, as the old historian would have put it, they shared a destiny.

Night fell again. Still Sunport was burning.

Smoke blotted out the stars. The eastward horizon was a wall of terrible red. Lightless towers stood against it, broken and truncated by the space bombardment, like monuments of some dead gigantic race.

They worked on without resting. Now and again, a clatter of automatic fire told them that the guards were fighting some intruder. It was midnight when they reached the valves of the *Nova*. Roy Kellon came out, with an arm in a sling, to inspect the battered hull.

Kellon stood back in the shadows, too weary to call out. His breath came faster, and his throat ached suddenly. Roy looked lean and strong; those were his mother's eager gray eyes.

"Come aboard," he called. "I think she'll do. I've patched up the damage in the power room. We can make Venus for repairs and supplies—and then the stars!"

Kellon followed the shuffling line of weary men and women through the valve. Roy was standing in the light, inside. His lean face lit with astonished pleasure, and he put out his good hand.

"Why, father!" he whispered. "I'm so glad!"

"Good to see you, Roy." Kellon blinked and tried not to choke. "Now I understand what you tried to tell me once—about the importance of those other planets." He gulped, and hesitated. "But—I'm an old man, Roy. If . . . if you need the space for younger men and women—I'll stay."

"Nonsense, boss!" Roy gripped his hand. "Tickled. Just so we get away before the Preacher comes."

"Forget the boss." Kellon grinned and blinked again. "But we'll be loading supplies on Venus. You'll find that I'm a hell of a good foreman on a cargo gang."

The skirmishing guards retreated aboard. The valves were sealed. Anxiously, Roy cut in the *Nova's* untested drive. She lifted silently, swifter than any uniton vessel had ever been. The burning city slipped beneath its dark shroud of smoke. Ahead were the stars.

THE END.





# SOUP KING

By Colin Keith

● The ship crashed on Venus, with a gold mine<sup>1</sup> as its landing spot. Fine for everybody but the cook. But he did better—he fell in the soup!

Illustrated by Kolliker

"Waw! Ga-a-ah! What slop!" roared Buck Reagan, captain of the interplanetary freighter *Pelican*, and hurled the offending bowl of broth from him. "Where'n hell is that fat slob of a swillmixer? I'll soup him . . . I'll rip him into giblets . . . I'll—"

In the pantry the usually sunny-disposition cook, plump little Jimmy Laird, heard and quailed.

He had tried his best, but his bosses just wouldn't be pleased. And his bosses were everybody else in the ship, according to the age-old tradition that a ship's cook is the lowest form of human life. The chow was bad, he knew that. But it wasn't his fault. How could anybody dish up a palatable meal when all he had to work with were vile-tasting and worse-smelling synthetics? What did

they expect but stinking slops when the ingredients were slabs of the malodorous trephainin, flavored with the bitter, belch-inducing vitamoses, reinforced by calorigen tablets, and supplemented by the nauseous compound called proteinax? But whatever the newest bit of hazing Buck Reagan had planned for him, it was never applied. For, while the skipper was still bellowing his displeasure, the mate cut him off with a sharp warning.

"Hold it, chief," shouted Holt. "We've lost the beam."

"What!" blasted the captain. His angry eyes sought the visiscreen, but all that there was to be seen there was shapeless, swirling white mists. The nephoscopes were just as noncommunicative—the readings all around and up and down were the same, one hundred percent. Clouds, clouds, everywhere. Venus was always like that, once you got below the topmost cirrus layers. Without the radio beam from Venusport, the planet's only authorized port of entry, blind landings were impossible. There were too many uncharted mountain ranges. Reagan's finger found the call button to the tube room and jabbed it.

"Up blasts," was the curt order that followed, and they set themselves for the kick of quick acceleration, for they had already braked down to airborne glider speed.

The tubemaster never had time to comply with the order. A shape flashed on the screen—a gray, dripping, cruelly jagged pinnacle of rock trailing wisps of cloud showed for an instant, then vanished. And with its vanishing there was a heavy jar and the scream of rending hull plates. The *Pelican* caromed off, swerved like a shying horse, then plunged sharply downward. A tube sputtered, tried to fire, and then the ship sideswiped another crag, bounced heavily, only to plunge nose first into something immovable and hard. The lights went out as men were flung about like tenpins. Then for a time there was dead silence broken only by a hissing as the broken ship's internal pressures adapted themselves to the lesser one of Venus' substratosphere.

"Well, at least we're all alive," drawled Holt, as the last man crawled out to join the huddled group shivering in the sleety rain. The deserted wreck of the *Pelican* sprawled before them, its crumpled nose embedded in a towering cliff and its precious cargo of food pellets for the Venusian colonists spilling out through the ragged wounds in its sides. They could see vaguely through occasional rifts in the misty curtain about them that murderous peaks rose everywhere. What lay in the valleys far below could only be guessed at, for they were buried under a blanket of scurrying clouds driven by the icy highland wind.

"Humph," snorted the captain. Alive, yes. But

their ship and cargo were a total loss, and they had little idea where they were. Somewhere, far down in the steaming jungles of the foothills, there might be a trading post or regional smelter, but how far and in what direction they could only guess. Conditions on Venus were most unfavorable to surveying and few maps existed. But Reagan unfolded a sketchy chart and began puzzling over it.

Avrig, the tubemaster, took the opportunity to stroll away. He rounded the broken stern and looked despondently at his smashed tubes. He saw the last of his fuel supply dripping from his gashed bunker tank. And then he walked on to have a look at the ship's other side. It was as bad or worse than the other. Then he stared at the forbidding cliff that had stopped them. In another moment he was yelling madly and bounding back to where his shipmates stood.

"Hey, fellows—come see! I've struck it rich. Gold—tons of it. I'm a multimillionaire—"

"Whadda you mean, you're a multimillionaire?" asked Holt scornfully. "This is a co-operative outfit."

"Yeah," bubbled Avrig, jubilantly, "but the cruise is over—the old *Pelican* is done for—through. That washes up our agreement. But don't worry, I'll need help to cash in, so you'll all get a good cut—"

There were sullen murmurs among the crew and Holt growled.

"Our agreement says that all profits of the cruise 'however derived' shall be whacked up amongst us—a third to the skipper, a quarter each to you and me, and the rest divided equally among the men. Furthermore, the agreement is in effect until the end of the cruise, which means until we all get back to the port we started from."

"It's mine," insisted Avrig stubbornly, "by right of discovery. I saw it first—"

"I put the ship down here," said the captain coldly.

"Oh, yeah?" remarked Holt. "Or did I? I'm the guy that lost the beam."

They glared at one another. Then Buck Reagan suggested it might be sensible to see whether Avrig had really found anything worth squabbling over. The bedraggled group rounded the battered stern and gazed up at the cliff. It was there, all right, a colossal treasure. A great fault had split the cliff and in the wide fissure masses of quartz were packed, heavily grained with metallic gold and studded with immense nuggets. Jimmy Laird gaped with the rest, but he did not share their elation. For he and he alone of all the ship's company did not share the common agreement. Behind his name on the muster roll were the qualifying words, "landsman for ship's cook, for keep and wages only." There was a moment of stupendous silence as the onlookers made estimates

of the wealth before them. Then the captain spoke.

"There we are, boys. It belongs to all of us. Break out those tools in No. 4 and hop to it."

There was a chorus of approving yells and Avrig knew he was beaten. He shrugged and started away with the others.

"Excuse it, please, sir, but could I say a word?"

Jimmy Laird had mustered up courage to address the captain otherwise than in frightened response.

"No. You're out of this," was Reagan's curt reply. "Grab a pick and get in there and do something to earn your pay. It's a cinch you're no cook."

"But, sir, the Venusian law—" Jimmy persisted.

"To hell with the Venusian law! With this dough we can grease our way past any law. Get going!" And Reagan emphasized his order with a swift kick.

Jimmy Laird went, crestfallen and wounded in spirit. For, despite his mistreatment, he still bubbled over with good will toward everyone, and he also feared the men of the *Pelican* were riding for a fall and felt that he should warn them. On a shelf in his galley there reposed a thick gray book entitled "The Revised Statute of the Dominion of Venus" and he had whiled away many of the tedious hours of the long voyage by reading it. Venus, he learned, had a very peculiar economy and therefore a very peculiar system of government and set of regulations. Jimmy Laird was a cook, not a lawyer, but he could read. Reagan's crowd were going about things the wrong way.

He might have swallowed the last insult of the captain if he had not been put in Avrig's gang for the afternoon shift. Avrig was full of rankling disappointment at having to content himself with a quarter share of his Golconda and consequently drove his men hard. And since many of them were as hard-bitten as himself and as likely to take a swing at him as not, he vented most of his irritation on the hapless cook, ridiculing him for his chubbiness and making sarcastic remarks about his flabby muscles. That night, when Jimmy Laird huddled down with the other crew members in their makeshift shelter for a night of cold, damp rest, there was a glow of resentment in his ordinarily mild blue eyes, and a flush of shame on his cheeks. Moreover, his hitherto unused muscles ached abominably.

It was some time after the others began snoring that he rose and stole into his wrecked galley. There he stuffed his pockets with concentrated food tablets. Then he slipped out into the raw, windy night. A moment later he was plunging down the mountainside, loosing small avalanches at almost every stride. And so went the night.

Morning found him deep in a forest of tall, coniferous trees in an upland valley. It was chill in that mist-filled grove, but not so chilly as on

the bare ledges of the upper heights. When the fog was lightened and warmed somewhat by the invisible sun overhead, he fed himself and slept for a while. Later he got up and continued his journey downward. His theory was that if he followed the watercourses he would sooner or later come upon an outpost of what civilization there was on the cloud-enwrapped planet.

Day after day he went on, ever down, down, down. It got warmer as he descended and the vegetation more dense. He sighted many weird animals, but they scampered away as soon as they sensed his nearness. The greenery took on a tropical cast and the undergrowth grew thicker. Thorny creepers tore at his clothes and ripped his face and hands. His shoes wore out and had to be discarded. Yet he pushed ahead. He could not stop now. His food supplies were running low and when they were gone he would have to die. Venus was an inhospitable planet to Earthmen, despite its lush vegetation and teeming fauna.

He thought on that, one night as he rested beneath a giant fern. It must be due to the absence of ultra-violet light, he concluded. Nothing that walked, crawled, swam or grew leaves on Venus but what was poisonous to man. But it had not always been that way, as the many ruins of great cities now overrun by the jungle testified, or the exhumation of great numbers of mummies of highly developed anthropoids closely resembling man. Physicists attributed the toxicity of Venusian life to the presence of such excessive moisture in the air that the shorter rays of sunshine could not get through. That had been a recent development, dating only from a few hundred thousand years back at the time of the Neovulcan Age when myriads of volcanoes had spouted vast quantities of hydrogen into the air.

There was nothing Jimmy Laird could do about that except to take care not to eat anything of native origin. But it did explain the basis of Venus' lopsided economy. Since it was fatally unsafe to eat anything of organic nature on Venus, her chief import was food concentrates. Such, indeed, had been the cargo of the ill-fated *Pelican*. Her exports, then, necessarily had to be minerals, in which the planet also abounded. Therefore her population was chiefly composed of miners, who, because of the hard and expensive living conditions, tried to clean up in two or three years and retire to Earth with their profits. Hence the greedy and grasping nature of the temporary residents that had earned the second of the sun's orbs the name of "The Chiselers' Planet." And from those hard facts also rose the meticulous mining laws of Venus and the arbitrary nature of its government.

All of which was no help at all to Jimmy Laird during his next trying week. He ate the last of his proteinax pills and sighed. He no longer re-

sembled his former self, for his grueling journey had stripped him down to bone and hard muscle. Now he was to know wasting hunger. But he struggled on, hoping against hope that somewhere in that foggy domain he would stumble upon a human settlement. He was in a lush, hill-inclosed valley, torn and twisted by many recent geological upheavals. The stream he followed broadened into a lake and he saw that the mouth of the valley was choked by a range of hills through which the mountain torrent had been forced to cut a canyon. To skirt the lake he had to make a wide detour along the flanks of the surrounding mountains. It was on that trail that he made an astonishing discovery.

He came to a gully, down which a rivulet trickled. The gashed bank on the other side clearly revealed the tormented and twisted nature of the underlying strata, for layers of sandstone, folded like the crumpled pages of a book, were in plain sight, interspersed with other layers of clay, limestones and dark-colored matter. The gully was deep, but not too wide. He thought he might leap it. He withdrew a few yards and ran, gathering himself for the jump. But at the very edge of the ravine a creeper grabbed his foot. Instead of leaping free, he tumbled heavily and fell, face-down, into the muck of the bottom.

It was disconcerting. For he had instinctively yelled as he fell and struck with a wide-open mouth. When he sat up, not only was his face plastered with the clinging filth of water-soaked, decayed vegetation, but his mouth was crammed with it. He sat up, clawing fiercely with his hands to free his face of the slimy stuff and spat energetically to rid his mouth of it. Then his expression underwent a strange transformation. He froze where he sat, and blinked. His tongue tentatively roved his mud-incrusted teeth, his throat automatically gulped down what was found there. The sludge slipped into his gullet and he licked his lips for more. The stuff was good! It had taste—such taste as the old dietetic legends told of as pertaining to such archaic items as broiled sirloin, mashed potatoes and gravy, luscious artichokes and the like. Jimmy Laird smacked his lips and his hands reached down into the gummy slime for more.

"Boy, oh boy," he murmured, "not bad. No, not bad." Then, reconsidering, he revised his opinion. "It's wonderful," he breathed ecstatically.

For five days he camped beside that stream, eating greedily of its mud. His formerly opulent belly, then hanging in loose, flabby folds, regained its plump tautness. Once again rosiness drove the pallor from his cheeks. Jimmy Laird was himself again, despite his early fears that he might have poisoned himself by eating the forbidden fruits of Venus. Yet nothing adverse happened,

and he set about making the strange food even more palatable. On the second day, after the first blush of enthusiasm for sustenance had worn off, he became aware of a certain grittiness in his Heaven-sent manna. He cured that by the simple expedient of filtering the substance through the tail of his shirt. Then it occurred to him that heat would improve it. So he contrived to build a fire, and, using the abandoned carapace of a huge tortoise for a caldron, made himself a pot of soup.

"Yum, yum," was his reaction, innocent of the fact that he was recoining an expression that had not been used for many centuries. And, appropriately, he rubbed himself in the middle in gesture of gratitude to whatever forest god had thrown the miraculous food in his way.

By sniffing diligently about the spot of his find, he finally located the source of the edible matter. It came from an inverted horseshoe crevice in the creek's bank, the barely exposed top of a sharp syncline. The waters of the stream had long since eroded most of the crumbly, olive-green substance that had composed the original stratum, but a good deal of it still clung to the top of the arch. He broke that off in chunks and made a pile of it beside his improvised camp. Then he systematically went about its refinement, bringing it to a boil, skimming off the scum that rose to the top, and filtering out the sand. Then he let it boil down to a stiff sludge which dried into a cake. Then he broke it into bits of convenient size and filled his empty pockets with them. Having thus fed, rested, and replenished his stock of provisions, he resumed his downward trek.

It was only two days after that that he stumbled upon a trail. It was a jumble of curious nine-toed footprints which he guessed to be the spoor of the sturdy hippoceras, the commonest beast of burden on Venus. Later he came across the ashes of old campfires, discarded food containers, and other evidence of man. It was not long before he smelled smoke and saw the stacks of a smelter looming up over the trees. And then he came to the edge of the clearing. Before him was a considerable town. The first leg of his journey was over.

He walked on, surprised that there should be so little signs of life. After a little, he entered a street between two rows of shacks. On the steps of one of the crude dwellings, two men sat. They were pale, gaunt and emaciated, as if from illness or long fasting, and their grimy miners' rags flapped idly on them. They were sizing up the rotund figure of the newcomer with unconcealed disfavor. Or was it envy?

"Howdy," said Jimmy Laird, ignoring their manifest hostility. "What town is this?"

"Hah!" snorted one, "as if you didn't know, you gluttonous slob. I can tell you this, though, you're wasting your time. We don't want no truck with

Hugh Drake or any of his hirelings. We're hanging on to our claims, you understand, even if we starve. So you get to hell out of here while you're all together. This ain't a healthy section of town for profiteers or profiteers' jackals. See?"

He spat disgustedly. The other man spoke.

"You can tell Hugh Drake that a friend of mine had a letter a couple weeks ago from Venusport, and that it said the *Pelican* was due any day. So we know the food caravan will be coming in most any time now. Hugh Drake can go pound mud in his ear."

"Hey," said Jimmy Laird. "I'm from the *Pelican*. She won't ever get to Venusport. She's lying way up on the top of a mountain, all smashed up."

The men looked at each other in frank consternation.

"Where?" they asked excitedly, springing to their feet.

Laird shook his head.

"I can't tell you exactly. 'Way up there,' he waved his arm vaguely toward the misty region he had come from. "It took me the best part of a month to get down. The other men will be along later."

The men's faces fell. Now they registered blank despair.

"I guess Hugh Drake wins," said one, apathetically.

Jimmy Laird didn't quite understand the reference, but somehow he felt embarrassed. Absently, he put his hand in his pocket and drew out a chunk of his dried soup. He bit off a piece, then offered it to the others. They sniffed it, crumbled off bits, and popped them into their mouths.

"Say!" yelled the first one, "this is *good*. What is it—something new?" The other was chewing ravenously, the picture of bliss.

"It's better with hot water," said Laird, pulling a double handful from another pocket. "If you've got a stove and a pot, I'll fix you up a mess."

"We ain't got any money," said the starved miner, suspicious again, "and we ain't trading a grade-A iridium claim for no bowl of soup—"

"Oh, that's all right," assured Jimmy Laird. "I wouldn't think of taking money for this stuff. Anyhow, there's plenty more where it came from."

An hour later he was presiding over a huge tureen of steaming soup, while an endless procession of undernourished miners trooped past, each carrying a cup in hand. His new-found pals, Elkins and Trotter, had lost no time in passing the word around the neighborhood that Santa Claus had come to town. After the kettle had been emptied and refilled five times, the stream of starving men dwindled. Then Elkins and Trotter enlightened their benefactor as to the local situation.

"This Hammondsville is a tough town," said Trotter. "Old Man Drake owns the smelters; he owns the store and the bank and all these houses, and he owns the hippo herds. No matter what we do, he gets his cut. But where he gouges us the worst is on his food racket. Every year the caravan comes up and stocks the government dispensary and carries back the ingots in return. The hell of it is that they never leave enough at the dispensary and it usually runs out before the caravan gets in again. That's where Drake gets in his dirty work. At the dispensary we pay a pound of gold for an ounce of trephainin, but when we have to buy it from Drake, the sky's the limit. He'll say he hasn't got any to spare until a guy's practically starving and ready to assign his claim. Then Drake feeds him and pockets the mine. He's got a lot that way."

"He's a skunk," asserted Elkins, dismally. "Now you know what a jam we're in here. Down at the caravan loading square there's stacks of gold and iridium ingots as high as your head, and not a bite to eat. And if what you say about the *Pelican* is true, we may not get another caravan for months. The hospital's already full, and a waiting list to get in. But even that don't help. I hear they're about out of concentrates, too."

"Well, say," said Jimmy Laird, emptying his pockets, "that's not right. Take 'em this. I'll go back and get another load."

It was his turn to tell a story. He told them of the crackup of the ship, the gold strike, and what the captain and crew were doing. Trotter chuckled.

"I know that lode. It's a good one, but it's too far. Besides, you can't get a hippo to go above the timber line. Those fellows woulda been smarter if they had loaded up with the pellets in the cargo and come down with *them*. The way things are here, they coulda had all the gold and platinum in town. You did better than all of 'em put together. There's a big bonus offered for anybody that can start a food industry on this planet."

Laird described his find in detail.

"Lemme see," said Elkins, studying the ceiling. He felt very fine, now that his hunger was assuaged. "That would be Starvation Valley—all the strata churned every which way. You made a strike, then it dives outa sight. Many a one of us has gone broke there. It burns you up to keep having to drive new shafts, and even then you lose the pay streak nine times out of ten."

"Wait a minute," said Trotter. "This stuff of his is soluble. All we need is a drill rig and a donkey boiler and some pipe. Shove down a pair of pipes, shoot steam down one and soup comes up the other. Dry out the steam in condenser pans, and there's your concentrate. I think the fellow's got something."

There was a little talk of ways and means. It did not take long to find willing helpers. A dozen miners, grateful for being saved from Drake's clutches, came in with offers of the loan of equipment. Even a small herd of privately owned hippoceri was located. Then, at Trotter's and Elkins' insistence, Laird hid himself to the local registrar of claims and filed his claim. After that they assembled their expedition and set off.

It is remarkable what enthusiasm can do. In ten days Starvation Valley was a hive of activity. Men, not only willing but eager to work for mere food, had done wonders. Two donkey boilers puffed away, fed by cords of wood that had been cut by the volunteers. From four pipes driven deep into the sunken stratum, which Laird's self-appointed experts found sloped sharply downward from the outcropping he had found, jetted rich soup. The pipes delivered their streams through strainers to drying pans from which the condensed essence was cut in cubes and wrapped. A few of the patient, plodding, piglike hippoceri were always present, being loaded with hundreds of pounds of their precious cargo for the lower valley.

"Old Hugh Drake will be plenty sore about this," grinned Trotter. "He hasn't made a dishonest nickel this year. But you'd better watch him, kid; he plays dirty pool."

Jimmy Laird grinned back and pointed to the newly painted sign that one of his admirers had put up. It read: "Laird's Luscious Soupery—Keep Out!"

"That won't help you, kid, if the old pirate really gets his back up. He's got drag."

Laird found out that was true prophecy when he went down to Hammondsville again. He had just left the dispensary where he had been informed that the replenished stocks were more than satisfactory. "The stuff is swell," the chemist in charge said. "We analyzed it, and it's got everything—all the known vitamins, and calories enough to keep a working elephant going. We'll take all you send at the regular rate. Venusport and the other towns can use it, too, and that means that hereafter we can import a few luxuries from Earth." That had been reassuring, but when Jimmy Laird walked out and was halted by a member of the constabulary, he did not feel so good.

"Your name Laird?" asked the man. He was a hard-faced customer with steely blue eyes and a cast-iron jaw. Laird admitted that was his name.

"O. K. We've got a place all swept out for you at the hoosegow. This way."

Laird looked at the six feet of brawn, at the ham-like fists, at the flame gun at his belt, and back again to those boring, merciless eyes.

"Yes, sir," he said. And he followed. He felt miserably insufficient, as he always had when in

encounter with the brutal, direct-action type. He sighed, but there was nothing else he could do. Just follow.

Mr. Drake, he was soon to learn, had preceded him to the town's police station. He was a skinny, grasping old man with gleaming eyes separated by a hawk nose.

"Get it all down," he croaked to the booking clerk, "illegal entry, working a mine without a license, inducing men to work for him without wages. I claim the reward under the terms of Article 456 of the Mining Statutes, which entitles me to receive one third interest in any confiscated property denounced by me."

"It's all down, sir," said the subservient clerk. "Officer, lock this man Laird up in Cell 21."

Jimmy Laird was pretty downhearted. He had had misgivings all along. For he had read those very statutes and knew they had him. To be eligible to own a mine on Venus, one must first duly pass the immigration office at Venusport, pay his head tax, and receive a license. The penalty for failure to comply was confiscation of the mine, a heavy fine, and deportation. If unable to pay the fine, he was subject to indenture to whatever citizen of Venus who did pay it. That meant he would probably become one of Drake's vassals.

Jimmy Laird languished in that jail for a solid month with nothing to divert him but his own gloomy thoughts. Then came a day when the footsteps of a keeper resounded in the metal corridor and he was told to come out. Court was about to convene.

The courtroom was packed. As Laird found out later, a famous high judge had been sent up from Venusport to try the case, in view of its importance, but Jimmy had no inkling of that when he glanced up and saw his forbidding countenance, and the scowling prosecutor arranging his papers. So he sat down meekly in the prisoner's dock and looked out onto the crowd of miners assembled in the seats. He picked out Elkins and Trotter and others he knew, and noticed that Elkins stood up and clasped both his hands together in the traditional distant salute of friendship. Then he turned to hear what the damning evidence against him was.

There was not so much of it at that. A drier-than-dust clerk of the central registration bureau at the capital testified that there had never been a mining license or entry permit issued to any James Laird. He sat down. Then Hugh Drake arose to speak of illicit mining operations in Starvation Valley he had observed from under cover, and of the distribution of non-approved food products at cut prices throughout the local area. He demanded confiscation of the mine, and all other penalties. After that the prosecutor summed up in a florid denunciation of schemers and would-be



get-rich-quick irresponsibles who tried to exploit the lovely planet of Venus for their own selfish needs. Jimmy Laird listened to his eloquence with a quivering and despondent heart.

"Therefore," thundered the prosecutor, "I demand the condemnation of this Earthling upstart for illegal mining and the assessment of all the penalties he so richly merits." He yielded the rostrum with a triumphant glare at a small, dapper gentleman who sat at a nearby table. Jimmy Laird looked at him, also, and in some surprise, for he had not noticed him before and had no idea who he might be. The new figure got up and addressed the judge.

"I move," he said, in a startlingly clear voice, "that this case be dismissed for lack of jurisdiction. This is a mining court. My client is not, and never has been, engaged in the pursuit of mining—"

Jimmy Laird started. *He a client! How come?* He had hired no lawyer, or even seen one. They had held him too tightly incommunicado for that. Yet here was a man referring to him as "my client."

But the prosecutor was on his feet again and angrily objecting.

"Your honor, this motion is frivolous and absurd—mining is defined as the occupation of digging or tunneling in the ground. The defendant has done that. I know that my opponent in his brief contends that since the substance mined is organic, it ceases to be a mineral but a foodstuff. Again he is defeated by the definition. A mineral is anything that is obtained by digging, whatever its composition or ultimate origin. The decisions sustaining that point are too numerous to mention; the courts have invariably held that such products as petroleum, natural gas, coal, and even lignite are minerals."

"Quite so," smiled the dapper counsel for defense. "Are we then to presume that my learned

adversary considers peanuts, truffles and potatoes minerals? Is the cutting of peat a mining operation?"

The judge blinked. Then said, "Go on."

"I have been retained by the outraged citizenry of this town to assist in this case, and I have studied all its aspects thoroughly. The nature of the alleged mineral, for one. Both the Geologic and the Biological Bureaus have made investigations and reports. The former states that prior to the Era of Neovulcanism, when Venus' climate was not unlike the Earth's, vegetables and animals nutritious to man abounded. At the time of the great eruptions, these were struck down, engulfed and buried by volcanic ash. The result was a layer of ancient forest mold enriched by the addition of many plants and animals. This was later overlain by other rocks, and became dessicated and compressed to its present form. But at no time has its essential organic nature been altered. The Biological Bureau reports that Laird's Luscious Soup is nothing other than an infusion of that substance which we now know to be so rich in vital food values, and soup, traditionally, is just such an infusion of selected organic juices.

"Moreover, the Viceregal Decree of Decimo 14, 2047, for the Encouragement of Food Production on Venus uses these words: 'Any person, of whatever planetary allegiance, and whether or not so specifically licensed, who may discover and develop a source of natural food upon this planet, shall be awarded a suitable bonus, a free site of operations, and shall be entitled to the full protection of the government, whether such food supply shall derive from farming, fishing, trapping, or otherwise.' That *otherwise*, I submit, disposes of the charges completely."

As the lawyer finished, the crowd broke into a wild cheering that made the walls rattle despite the judge's vigorous pounding for quiet.

"Don't let Hugh Drake put that over! . . . Hooray

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**BOON!**

**SWOON!**

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While the excited miners yelled, Trotter advanced down the aisle carrying a steaming pot of Laird's Luscious Soup. The tumult was so great that no one could hear what passed between him and the judge, but in a moment the jurist raised the offered cup and took a sip. The smacking of judicial lips that ensued could not be heard, but the melting of his stern expression to one of easy contentment could be seen by all. Hugh Drake and the sycophantic prosecutor edged their way toward a side door. They had read the handwriting on the wall even before the judge sat up and cried:

"Case dismissed."

"Shucks," said Elkins, once they were outside. "It was no trouble at all. We passed the hat and then hired that fellow from Venusport. We figured we owed that much to you."

Laird bubbled his thanks. But he noticed Elkins seemed troubled about something. Jimmy asked him what was on his mind.

"Well," drawled the miner, "it's this way. The fellers have helped all they could and you have a fair start and all that, so they're thinking something about their own business. You see, now that they're fed and grubstaked for the season, they want to get back to work on their own claims. I know that's going to be hard on you—there's so little free labor hereabouts, what with Drake having all the down-and-outs vagged and bound out to his smelters—but the boys'd appreciate it if you could let them go."

"Sure," said Jimmy Laird, not wanting to discommode any other human being. "I'll find a way."

It was not easy, though. When he got back to Starvation Valley and let his helpers go, he found that there were not enough hours in the day for him to stoke both boilers, cut and carry wood, run his drying pans and the packaging. And it was out of the question to load the hippos and drive them down to Hammondsville and back, unless he shut down from time to time. With the whole planet clamoring for the new and tasty food, he was reluctant to do that.

It was just when he was wrestling with that problem that the first of his former shipmates showed up. It was one of the tube gang, and he

was as haggard and bedraggled a specimen as ever came stumbling out of the jungle. His clothes were in shreds and he was wolfishly hungry. Moreover, he carried not an ounce of gold. He had discarded that a long time back in his frantic effort to find haven and food before he caved in. Jimmy Laird fed him and gave him a place to sleep.

By twos and threes, the remainder of the crew straggled in, all in the same or worse condition. They had made the initial mistake of starting out with too heavy a load of the nuggets and not enough of the *Pelican's* bountiful supply of food pellets. The result was inevitable. By the time they reached Starvation Valley, they were empty-handed and mere shadows of men.

Captain Reagan was as hollow-cheeked and crestfallen as any. He took Laird's handout without a word and gulped it eagerly. The warm, strong broth perked him up considerably, and he cast an inquiring eye about the clearing where the two puffing boilers stood, the neat sleeping shacks and the cooking pans. Then he asked if there was a town nearby where he could make arrangements for the transport of their mountain treasure.

"Well, I'll tell you," said Jimmy Laird, hospitably ladling out another bowl of the fragrant soup, "there is, but I'd hate to see you go there the way you are. It's on account of those mining laws I tried to tell you about. They'll grab your mine, if anybody thinks he wants it, and throw you in the clink. And then, when you can't pay the fine, they'll sell you as a smelter hand. It's a hard game to beat."

Buck Reagan looked unhappy. After his cook's desertion, he had come across the volume of laws and read them.

"Of course," Jimmy went on, "knowing how you feel about it, I kinda hesitate to offer you a job with me, but then again it might help you out of your jam. I need men. And I'll pay good wages and feed you, too—"

"We'll take it," said Captain Reagan, despairingly, looking at the boilers with fresh curiosity. Jimmy Laird's flamboyant sign faced downstream so its face could not be read from where Reagan sat. "What will we have to do?"

"Help me make soup," said Jimmy Laird. And he never did understand why the captain almost choked.

THE END.





# MECHANISTRIA

By Eric Frank Russell

● Planetographers expect the dangerous animals, but this world had something different!

Illustrated by Kolliker

I.

There we were, standing on the mezzanine of Terrastroport Seven Administration Building. Not a darned one of us knew why we'd been summoned so unexpectedly, or why we weren't sailing as usual for Venus in the morning. So we hung around, asking unanswered questions of each other with our eyes and getting ourselves nowhere. I'd once seen thirty Venusian guppies gaping in adenoidal dumfoundedness at an Aberdeen terrier named Fergus and straining their peanut brains

AST—3a

for a reason why one end wagged. They looked pretty much as we were looking right now.

Portly and bland as ever, Captain McNulty came in just as the nail-gnawing contest was about to begin. He was followed by half a dozen of the *Upsydaisy's* leading technicians and a skinny little runt we'd never seen. In the rear came Jay Score walking lithely over floor boards that squeaked under his three hundred pounds. I never failed to be surprised by the casual ease with which he carried his massive frame. His eyes were bright as they gave us an all-embracing look.

Strutting onto the dais, McNulty said, "Gentlemen and vedras, I have with me this afternoon the famous Professor Flettner." He made a precise bow toward the runt who shuffled around and grinned like a kid caught snitching the fudge. "The professor is seeking a crew for his extrasolarian vessel, the *Marathon*. Jay Score, six of the staff, have volunteered with me. We have been accepted, and have received the necessary extra training during the term of your leave."

"It was a pleasure," put in Flettner, speaking as if he were anxious to placate us for stealing our skipper.

"The Terrestrial government," continued McNulty, slightly flattered, "has approved the entire complement of my former command, the Venusian freighter *Upskadaska City*. Now it's up to you! Those who wish to stay with the *Upskadaska City* may leave and report to her in the normal way. Will those who want to accompany me please signify by raising a hand?" Then his inquiring eye discovered the small group of Martians, and he added, hastily, "Or a tentacle."

Sam Hignett, the *Upsydaisy's* Negro surgeon, promptly put up his hand and said, "Captain, I'd like to be with you."

His black mitt only beat ours by a fraction of a second. Funny thing, not a single one of us was really bursting to go on Flettner's suicide box. It was just that we were too weak to refuse. Or maybe we stuck out our necks for the pleasure of seeing the look of pride that illuminated McNulty's plump features.

"Thanks!" said the skipper in the solemn sort of voice they use at burials. His gaze roamed over us almost lovingly, became suddenly abashed as it found one Martian figure flopped in a corner, all its limp tentacles lying indifferently on the floor.

"Why, Sug Farn," he began.

Kli Yang, the head *serang* of the Red Planet bunch, chipped in quickly with, "I put up two tentacles, one for me, one for him. He is asleep. He deputed me to act on his behalf, to say yes or say no or sing 'Pop Goes the Weasel' as required."

Everyone laughed. Sug Farn's utter and complete laziness was a feature of life aboard the *Upsydaisy*. The skipper alone was unaware that nothing but an urgent outside job or a game of chess could keep Sug Farn awake. Our laughter ended, and the sleeper immediately filled the silence with one of those eerie, high-pitched whistles that is the Martian version of a snore.

"All right," said McNulty, a dignified smile around his mouth. "I want all of you to report aboard the ship at dawn. We blast at ten ack emma G. M. T. I'll leave Jay Score to give you further information and answer any questions."

The *Marathon* was a real beauty, Flettner designed, government built, with fine lines halfway

between those of a war cruiser and those of a light racing rocket. Inside, she had space-navy fittings. I liked her. So did the others.

Standing at the top of the telescopic metal gangway, I watched the last comers arrive. Jay Score went down, returned lugging his enormous case. He was allowed more weight in personal luggage than any three others. No wonder, for only one item among his belongings was a spare atomic engine, a lovely little piece of engineering weighing seventy pounds.

Four government experts came aboard in a bunch. I'd no idea of who they were or why they were sailing with us, but directed them to their private cabins. The last arrival was young Wilson, a fair-haired, moody lad of about nineteen. He'd had three boxes delivered in advance and now was trying to drag three more aboard.

"What's in those?" I asked him.

"Plates." He looked at the ship with open distaste.

"Repair, dinner or dental?" I inquired.

"Photographic," he snapped without a glimmer of a smile.

"You the official picture man?"

"Yes."

"O. K.! Dump those boxes in the mid-hold."

"But—"

"You heard me!" I liked the kid's looks, but I didn't like his surly attitude.

Putting down the boxes at the top of the gangway, he looked me over very slowly, his gaze traveling from feet to head. His lips were thin, his knuckles white.

Then he said, "And who might you be when you're outside your shirt?"

"I'm the sergeant-at-arms," I told him, sharply. "Now dump those boxes where they'll be safe, else I'll toss them a hundred feet Earthward."

That seemed to get him right in his weak spot. I think that if I'd threatened to throw him for a loop, he'd have had a try at giving me an orbit of my own. But he didn't intend to let me pick on his precious boxes.

Favoring me with a threatening look, he carried the boxes into mid-hold, taking them one at a time, tenderly, as if they were babies. That was the last I saw of him for a while. I'd been hard on the kid, but didn't realize it at the time.

A couple of the passengers were arguing in their harness just before we threw ourselves away. It was part of my job to inspect all strapping, and they kept at it while I was going over their braces.

"Say what you like," said one, "but it works, doesn't it?"

"I know damn well it does," yelled the other, angrily. "That's just the hell of it. I've been right through Flettner's wacky mathematics a

thousand times, and the logic is all right, but the premise is crazy."

"So what? His ships have got to the Jovian System and back simply by going *zip!* and *zip!* They've done the round trip in less time than an ordinary rocketship takes to make up its mind. Is that crazy?"

"It's nuts!" howled the objector, his blood pressure still rising. "It's magic and it's nuts! Flettner says all astronomical distances can be scrapped because there's no such thing as speed inside a cosmos which itself, plasma and ether alike, is in tremendous motion of infinite variability. He says you can't have speed where there's nothing to which you can relate it except a fixed point which is purely imaginary and simply can't exist. He claims that we're obsessed by speeds and distances because of the established relations inside a one-cent solar system, but that no such limitations exist in the greater cosmos."

"Me," I put in, soothingly, "I've made my last will and testament."

He glared at me, then snapped to the other, "I say it's crazy."

"So's television and arguers," answered the other, imperturbably, "but they both work."

McNulty came by the door at that moment, paused, and inquired, "Seen to that lad Wilson yet?"

"No—I'll be there in one minute."

"Try and cool him down, will you? He looks like he's in a blue funk."

I got to Wilson's cabin, found him sitting there with his harness on. He was dumb, glassy-eyed, looked worried stiff.

"Ever been on a spaceship before?"

"No," he growled.

"Well, don't let it bother you. I admit there're rare occasions when people go up in one piece and come down in several, but according to statistics, the roller coasters killed more last year."

"D'you think I'm scared?" he demanded, standing up so quickly that he startled me.

"Me? Oh, no!" I searched around for words I couldn't find. His bothered expression had vanished; he was beginning to feel somewhat hard. "Look," I offered, speaking as man to man, "tell me what's eating you and I'll see if I can help."

"You can't help." Sitting down, he relaxed, looked as moody as before. "I'm worrying about my plates."

"What plates?"

"Those photographic ones I brought on board, of course."

"Heck, they'll be safe enough. Besides, what good will worrying do?"

"Lots!" he said, flatly. "When at first I let 'em go on trust I had 'em wallopped to powder in two accidents. Then I developed the habit of worrying about them. I was doing a good job of worry-

ing just before the Century Express smash-up, and I lost only two, both unexposed. I worried all but six of my outfit safely through the big Naples quake. So it pays me, see?"

"Hell on a bike!" I said.

"Leave me alone and let me get on with my job," he muttered. Upon which he leaned backward, tightened his harness and calmly resumed his worrying.

Can you tie that? I was still stupefied by the queer tricks of some trades when I arrived at the scene of the uproar at the top of the starboard gangway. McNulty was bawling out the Martians. The latter had emerged from their especial quarters in which air was kept down to the three-pounds pressure to which they were accustomed, and they were now out in the alien and decidedly objectionable atmosphere.

Somebody went solemnly down the gangway bearing Earthward an enormous vase of violently clashing colors and exceedingly repulsive shape. The Martian chorus arose crescendo. There were shrill chirrup of protest and much snaking of angry tentacles. I gathered that the porcelain monstrosity was Kli Morg's chess trophy, a Martian notion of a championship cup. It was in vile taste. Anyway, the skipper's orders were orders, and the abomination stayed on Earth.

Next instant the siren howled its thirty-seconds warning and all those still out of harness raced for safety. The way those Martians dropped their oratory and beat it was something worth seeing.

I got myself fixed in the nick of time. The air locks closed. *Whoom!* A giant hand tried to force my cranium right down into my jackboots, and I passed out.

## II.

The world swelling rapidly before our bow was a little bigger than Terro. Its sunlit face was a mixture of blacks, reds and silvers rather than the old familiar browns, blues and greens. It was one of five circling a sun smaller and whiter than our own. There was also a small, insignificant group of asteroids circling around, but we'd had no difficulty in cutting through their orbit.

I don't know which star that sun was supposed to be, but Jay Score told me it was a minor luminary in the region of Bootes. We'd picked on it because it was the only one in this area with a planetary family, and we'd selected this second planet because its position was in nice, convenient relationship with our line of flight. At that, we were going a devil of a lot too fast to circle it and inspect it before dropping on some choice spot. We were striking its orbit at a tangent with the planet immediately ahead. The landing was to be a direct one, a hawk dive with a muffled prayer and no dancing around the mulberry bush.

The way Flettner's unorthodox notions went

into action was again something that brought your heart right into your gullet before you could swallow it back. I believe that the vessel could have done even better if its functioning wasn't handicapped by the limits of human endurance. McNulty must have got the measure of those limits with astonishing accuracy, for the deceleration and drop brought me down alive and kicking—but I had the deep impression of my harness all over my carcass for a week.

Reports from the lab said the air was twelve pounds and breathable, so we drew lots for first out. McNulty and all the government experts lost. That was a laugh! Kli Yang's name came first out of the hat, then an engineer named Brennand was lucky, followed by Jay Score, Sam Hignett and me.

One hour was our limit. That meant we couldn't

and glassy, there it was silvery and metallic, with patches of deep crimson appearing in odd places. I picked up one small lump of silvery outcrop, found it surprisingly heavy. Solid metal as far as I could tell.

I tossed the lump through the open door of the air lock, so's they could analyze it, and at once Kli Morg stuck out a furious head, goggled his eyes at the inoffensive Kli Yang, and remarked, "The fact that you are now with a bunch of Terrestrials doesn't mean that you have to be equally childish."

"Why, you amateur pawn-pusher," began Kli Yang, speaking with considerable warmth.

"Shup up!" Jay Score snapped the reproof, started off toward the setting sun. His long, agile legs moved as if he was commencing a circumnavigation of the globe. The radio hung easily from one powerful hand.

We followed him in single file. In ten minutes he was half a mile ahead and had to wait for us to catch up.

"Remember, long brother, we're only flesh and blood," complained Brennand as we reached the emergency pilot's huge, efficient figure.

"Not me," denied Kli Yang. He emitted a whistle of disgust, made swimming motions with his tentacles through air four times as thick as that of Mars. "I could row a boat!"

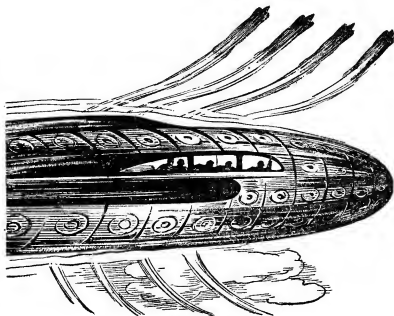
Our progress was a little slowed after that. Down into a deep shadowy valley, up the other side and over the crest. No trees, no shrubs, no birds, no other sign of life. Nothing but the black, silver and red semimetallic ground, a range of blue-veiled mountains in the distance, and the gleaming cylinder of

the *Marathon* behind us.

There was a swiftly moving river down in the next valley. Reaching it, we filled a flask to take back to the lab. Sam Hignett risked a taste, said the water was coppery but drinkable. The color of the rushing river was faintly blue with darker shades swirling in its depths. The banks were of ground considerably softer than the surface we'd just traversed.

Sitting down on the nearer bank, we contemplated the torrent which was too swift and deep to cross. After a while, a headless body came floating down.

The mutilated corpse resembled that of an enormous lobster. It had a hard, crimson shell, four crablike legs, two lobsterish pincers, and was half as big again as a man. Its neck was a raw, bloodless gash with white strings dangling from



go much more than a couple of miles from the *Marathon*. Spacesuits weren't needed, of course. Kli Yang could have used his head-and-shoulder contraption to reduce pressure to his customary three pounds, but he decided that he could tolerate twelve for one hour without getting surly about it. We hung binoculars around our necks, strapped on our needle ray guns, and Jay Score grabbed a tiny two-way radiophone to keep us in touch with the vessel.

"No fooling, men," warned the skipper as we went through the air lock. "See all you can and be back in one hour."

Kli Yang, last through the lock, ran his saucer eyes over the envious ship's company, said, "Somebody had better go wake Sug Farn and tell him the fleet's in port." Then four of his ten tentacles released their hold, he dropped to the ground.

My, was that ground hard! Here it shone black

it. What the missing head had looked like we could only imagine.

Full of mute menace, the cadaver turned and bobbed past us while we sat in a row and watched it, our eyes moving from right to left as if we were following a ball at a tennis tournament. What filled our minds was not the question of how the head looked, but who had removed it and for what reason. Nobody said anything.

This gruesome sight had barely departed in the grip of the rapid current when we got first evidence of life. Ten yards to my right was a hole in the soft bank. A creature slithered out of the hole, went to the brink of the water, drank in slow, delicate sips.

Four-legged, with a long, triangular tail, it resembled an iguana more than anything else. Its skin was black with an underlying sheen of silver like shot silk. Its pupils were black slots in silvery eyeballs. Length: about six feet, including tail.

Having swallowed its fill, the thing turned around to go back, saw us, and stopped abruptly. I fingered my needle ray, just in case it had inhospitable ideas. The thing examined us carefully, opened its mouth in a wide gape that revealed a great, jet-black gullet and double rows of equally black teeth. Several times it favored us with this silent gape before it made up its mind. Then it crept slowly up the bank, joined the end of our row, sat down and stared at the river.

I've never seen a sight crazier than that. There was Jay Score, huge and shining, his craggy features the color of ancient leather. Next, Sam Hignett, the Negro, his teeth gleaming in startling contrast with his ebony features. Then Brennand, an undersized white Terrestrial sitting beside Kli Yang, a leather-skinned, ten-tentacled, goggle-eyed Martian. Next, me, a middle-aged, graying Terrestrial and, finally, this black-and-silver wotzitz. All of us contemplating the river.

Still nobody said anything. There just didn't seem anything to say. We looked, the creature looked, all of us as phlegmatic as could be. I thought of young Wilson, and of how preciously he'd have mothered a plate with this scene on it. Then, as we watched, another body came floating along, one just like the first. No head.

"Somebody isn't popular," remarked Brennand, fed up with the silence.

"They're independent," informed the iguana, solemnly, "like me."

"Eh?"

Five people never stood up with greater promptitude or timed an ejaculation so perfectly.

"Stick around," advised the lizard. "Mebbe you'll see sumpin." It stared at Brennand, then slithered back into its hole. Silver gleamed along its black tail as it dived down.

"Well," said Brennand, breathing heavily, "can you pin your ears to that!" A dazed look in his eyes, he went to the hole, squatted on his heels, and bawled, "Hey!"

"He isn't in," responded the thing in the depths of the hole.

Licking his lips, Brennand gave us the piteous look of a hurt spaniel, then said, somewhat insanely, "Who isn't in?"

"Me," said the lizard.

"Did you," demanded the flabbergasted Brennand, standing up and staring at us, "hear what I heard?"

"You heard nothing," put in Jay Score, before we could reply. "It didn't speak. I was watching it closely, and its mouth never moved." His hard, brilliant eyes looked down at the hole. "It was thinking purely animal thoughts which you received telepathically and, of course, translated in human terms. But because you are not normally receptive of telepathic thoughts, and because you have not previously encountered anything that broadcasts on the human waveband, you thought you heard it talking."

"Stick around," put in the lizard, "but not around my hole. I don't like the publicity. It's dangerous."

Moving away, Jay Score picked up the radiophone, and said, "I'll tell them about the bodies and ask if we can explore a mile or two upstream."

He moved a switch. The radiophone promptly emitted a noise like Niagara in full flow. Nothing else could be heard. Changing to transmission, he called repeatedly, switched back and was rewarded only by the sound of a mighty waterfall.

"Static," suggested Sam Hignett. "Try lower down the band."

The radiophone had only a limited band, but Jay Score tuned all the way through it. The waterfall faded out, was gradually replaced by a shrill, dithering sound like that of million grasshoppers yelling *bitter-bitter-bitter*. That gave way to a high, piercing whistle, followed by another waterfall.

"I don't like it," commented Jay. "We're going back. Come on—let's move fast!"

Grabbing up the radiophone, he trudged rapidly up the bank and over the crest. His mighty figure looked like that of some old-time giant as it became silhouetted against the evening sky.

He put on the pace, making it a hard task for us to keep up with him. We needed no urging. Much of his uneasiness had communicated itself to us. Those headless bodies—

### III.

McNulty heard us through, sent for Steve Gregory and asked him to give the ether a whirl. Steve

beat it to his radio room, came back in a few minutes. His eyebrows were tangled.

"Skipper, it's alive from two hundred meters right down into the ultra-short waveband. There isn't room to get a word in edgeways."

"Well," growled McNulty, "what sort of stuff is it?"

"Three kinds," replied Steve. "There are whistles of a steady type which sound mighty like direction signals. There are eight different water-falls of considerable intensity. I reckon that those are power broadcasts. In between all these is an orgy of gabbling which suggests that this place is fairly crawling with life." He did acrobatics with his eyebrows, which were the bushy sort suitable for such performances. "Couldn't get any vision except for typical patterns racing across the screen."

Looking gloomily through the port at the bare expanse outside, one of the government experts remarked, "If this planet is well populated, we must have picked on the local Sahara."

"We'll use a lifeboat," decided McNulty, with characteristic promptness. "We'll send out three men, well armed and give them half an hour. They'll be able to cover five hundred miles and get back before it goes dark."

Most of us would have liked another lucky dip in the hat, but McNulty nominated the three. One of them was a government biologist named Haines; the others were engineers holding lifeboat coxswain's certificates.

It took no more than four minutes to swing out a lifeboat on its automatic derricks and lower it to ground. The three clambered in. All had needle ray guns. In addition, there were half a dozen atomic bombs on board, while a multiple pom-pom stuck its menacing bunch of barrels through a glass-turret in the tiny vessel's bow.

That little expedition was adequately armed all right! It wasn't so much that we expected trouble, or were going looking for it, but rather that we believed in doing more than keeping our fingers crossed.

With an amusingly squeaky blast, the twelve-ton cylinder shot from the *Marathon's* mothering bulk and curved skyward. It whined away to a pinpoint in no time, then it was gone.

Steve had reset the lifeboat's radiophone and was now in touch with it on four twenty meters. Biologist Haines was at the vessel's observation window doing the reporting.

"Sixty miles out and six miles up. Mountains ahead. We're climbing." Silence for a minute, then, "Over the top at twelve miles altitude. There's a long, straight, artificial-looking line cutting the foothills on the other side. We're diving toward it, lower, lower . . . yes, it's a road!"

"Anything using it?" yelled Steve, his eyebrows snaking around.

"Nothing as far as we can see. It's in excellent condition. Not deserted, I guess, but seldom used. Ah, another road over on the horizon, maybe forty miles away. We're making for it now. Seems as if . . . as if . . . there are shapes moving swiftly along it." Another pause while his listenersidgeted impatiently. "By heavens, there're dozens—"

The voice blanked out completely. Nothing more came over the ether except a steady rustling noise like that of dead leaves dancing in a random wind. Frantically, Steve went over his receiver, adjusting, re-tuning, doing all he knew to bring back the voice so suddenly gone off the air. But there was nothing, nothing except that persistent, eerie whispering on four twenty and the all-pervading uproar below two hundred.

The crew clamored for the chance to take out a second lifeboat. We had four of the little vessels as well as the slightly larger and much faster pinnace. McNulty refused to let any more go.

"No, men," he said, his plump features unworried, "I'm not sending out any more. We'll wait here. We'll stay until morning to give that boat a chance to find us again. It may be safe enough. Perhaps its radio has gone out of commission." A rare glint came into his eyes. "But if it's not back by dawn, we're going to discover the reason why!"

"You bet!" came the murmur of many voices.

*Thrum-thrum-thrum!* The sound had a chance to be noticed in the brief quietness. We realized that it had been drumming dully through the room for nearly a minute, but only now did it register on our minds. A strange, yet familiar sound, that steady thrumming—and it wasn't caused by the returning lifeboat.

A crew never poured through the air lock as quickly as we did then. Outside, we stood with our backs to the great, curved shell of the *Marathon* and stared at the sky. There they were, three, four, five of them; long, black rocketships flying in arrowhead formation.

Young Wilson's face lit up, he shouted, "Oh, hokey!" and produced a camera from nowhere. He sighted it at the black things above.

None of us had been quick-witted enough to bring out binoculars, but Jay Score didn't need any. He stood with his long legs braced apart, his big chest protruding, his head tilted back, his gleaming orbs on the spectacle above.

"Five," he said. "Ten miles up, traveling fast, and still ascending. They're either painted dead-black or made of some very black metal. Don't resemble any design in the Solar System. Their



stern tubes are exposed instead of being sunk in the stern, and they've even got fore and aft fins!"

He continued to watch long after I'd developed a crick in the neck. Still thrumming faintly, the five disappeared from sight. They'd passed right over the *Marathon* without noticing it, blasting at an altitude that made our reposing vessel less conspicuous than a dropped pin.

Kli Morg chirruped, "So they're not so far behind us after all! They've got rocketships, they decapitate lobsters, and they're probably hostile to strangers. I can see them offering us a big tentacle, yes, right in the masticatory orifice!"

"Hope for the best rather than expect the worst," advised McNulty. He gazed around at his crew, then at the sleek shape of the *Marathon*. "Besides, we're a darned lot faster than anything limited to a solar system, and we know how to look after ourselves."

He patted his needle ray suggestively. I'd never seen our plump and amiable skipper look so tough. He had a disarming habit of understating his sentiments, but, at the right time, he was a very hard egg.

Nobody, though, could look half as tough as Jay Score who was standing at his side. There was something about that guy's firm, solid, statuesque pose, his brief speeches and rapid decisions, and his fiery eyes glowing in a rocklike pan that gave him a look of serene power like you see on the phlegmatic faces of those unknown gods they've dug out of strange and lonely places.

Jay rumbled, "Let's go in and wait for dawn."

"Sure," McNulty agreed. "Tomorrow, whether that lifeboat returns or not, we'll get these mysteries sewed up."

He didn't know that tomorrow he'd be sewed up along with the rest of us. Neither did any of us suspect it. Young Wilson wouldn't have whistled half so shrilly and happily as he developed his plate had he guessed that it would be lost forever within twenty-four hours.

One of the navigators on the night watch first saw the machines. They appeared suddenly and furtively, about an hour before the pale dawn, ghostly shapes skittering around in the dark shadows. At first, he thought they were animals of some kind, probably nocturnal carnivores. But his doubts grew too strong, he sounded the general alarm and we went to our posts. An engineer trundled along a portable searchlight, positioned it behind a port, let its intense beam probe the encompassing gloom.

At the other end of the beam something big and glittering skedaddled out of the cone of light. It moved so promptly that nobody got more than a glimpse of it, but it left behind a vague impression of a tentacled globe encircled in the vertical plane by a rim like that of a wheel. It rolled along

on this rim, twisting and turning with astounding agility.

The searchlight couldn't follow it since the beam was projecting through the glassite pane and had no room to swing. We waited awhile, tense, expectant, but nothing else trespassed into the bar of revealing brilliance, though we could sense many things moving around just beyond the rays.

Digging out two more searchlights, we placed them behind two other ports, tried to catch our besiegers napping by turning the beams on and off at erratic intervals. This method was more effective. Again we caught a momentary view of the dodging globe-thing as it shot away from the sudden lance of the third light.

A minute later, the second light caught a great, trellis-patterned metal arm as it swung ponderously upward into concealing darkness. There was something big and brutal at the end of that arm, and it wasn't a hand. The thing reminded me of a mechanical excavator or steam shovel.

"See that?" yipped Steve. His face was dark behind the searchlights, but I knew where his eyebrows were going. Rumor had it that he'd once got them halfway down his back.

I could hear Brennand breathing heavily beside me, and a faint, subtle hum coming from Jay Score farther up the passage. There was a smell of warm air and warmer metal coming from the searchlights.

Knockings and scrapings sounded from dead astern. That was our blind spot, full of driving tubes, and we couldn't see what was going on. McNulty barked an order, and two engineers and a navigator beat it up to that end. There was no way of determining the capabilities of these things outside, but if they were detaching our interchangeable tubes—well, we'd be there forever.

Jay Score said, "We'd better go out and meet them, or blow away and leave them."

"Yes, yes, I know," McNulty was slightly bothered and slightly testy. "We still don't know whether they're hostile or not. I can't assume that they are and I don't assume that they aren't. We've got to be cautious. The Terrestrial authorities won't stand for any tough handling of natives without very adequate reasons." He sniffed disgustedly. "That means that if they're hostile we've either got to run away or sit here until they make our reasons adequate."

"I suggest," offered Kli Yang, brightly, "that we open the starboard lock and whistle 'em a little tune. When one of them comes up we'll jerk him inside and let him look us over. It he likes us, we'll kiss him. If he doesn't, we'll eject him—in installments if necessary."

*Prang!* The loud clangor came from the stern, echoed and re-echoed throughout the vessel. McNulty winced as he visualized one of his precious tubes springing from its patent socket. He opened

his mouth to say something, shut it as a bellow of rage came from the engine room. The next instant a terrific *crump* burst in the rear and the whole ship shot twenty yards forward.

Helping the sprawling skipper to his feet, Jay Score said, "Looks like Chief Andrews has settled the question. Nobody's going to fool around with his pipes."

An angry muttering was still trickling out of the engine room, a steady, determined rumble like that of a volcano held in check. McNulty knew better than to tackle the outraged chief in his present bellicose mood.

Looking out of the nearest port just as its light shot through once more, McNulty spotted a re-treating mechanism almost caught by the stabbing beam. Frowning, he spoke more to Jay Score than to the rest of us.

"We've a choice of two moves. Either we must blast off, or else stop them meddling with the ship. The first may mean losing the missing lifeboat. By the looks of things, the second will mean trouble." His roving gaze found Steve Gregory. "Steve, go and have one more try at raising that boat. If you can get it, we'll radio instructions and blast off. If you can't, we'll open up."

"Right, skipper," Steve departed, one brow still on his face. He returned within five minutes. "Not a squeak."

"Get your guns, men. Shift one of those lights into the starboard lock and aim it on the door gap." He stopped as the *Marathon* gave a sudden, heavy lurch, moving through an arc of ten degrees, then sluggishly rolling back onto an even keel. "And mount a pom-pom beside the light."

His listeners scattered at top speed, leaving him with Jay Score and the two engineers who were moving the light.

"*Whew!*" breathed McNulty. "I'd have thought this boat too heavy for a hundred elephants to move!"

*Clink-clink-clunk!* The noise rang gonglike through the *Marathon's* hull and sounded loudly in the armory where I was busy doling out persuaders. Came a second lurch, more violent this time. The arc was fifteen degrees or more, but again the ship reacted and staggered upright.

Running out with an armload of belts for the pom-pom, I found Jay Score by the inner door of the lock. The ship was just settling with a shudder. He didn't say anything, just stood there with his rubber-soled feet braced firmly on the steel checkerplates of the floor, his huge form erect, his glowing orbs upon the gradually turning disk of the outer door.

With everything ready, the big door wound inward along its worm, came to the end, drew free like a mighty plug. The control arm rolled its great weight aside and simultaneously the search-

light filled the gap with an eye-searing glare.

Many scuffings and scrapings sounded in the dimness outside, but for a long while nothing appeared in the opening. Probably they thought the gap was merely another port. Hushed with expectancy, we stood and waited, but still nothing came.

Greatly daring, a Flettner computer named Drake stepped into the column of light, walked slowly along the threadless stepping piece at the bottom of the circular door gap, stood on the outer rim and looked down. The next instant he let out a startled yelp and was snatched into darkness.

A big, broad-shouldered, bandy-legged engineer was almost on him when he went, with apelike speed reaching out a thick, hairy arm to grab the disappearing man's harness straps. For a moment, he stood defeated on the brink, then he, too, gave a gruff bellow and vanished. Brennand was in the middle of the hole, eager to fasten himself onto the engineer, but even as he snatched at thin air, McNulty gave a warning shout.

Brennand wasn't taken. He echoed the yells of the others as something outside tried to pick him from the vessel, bawled louder when a swiftly snaking Martian tentacle wound round his waist and dragged him back. It must have been an awful pull judging by the way Kli Yang's many great suckers flattened out on the floor.

#### IV.

McNulty said, with dangerous calmness, "What was it, Brennand?"

Before the other could reply there came a tremendous rasping and clanking from outside and a huge, square-ended and shining shape struggled into the opening. It faced the searchlight, being fully revealed in the glare. I had a good view of its boxlike front with a coiled copper antenna sticking out the top like a caricature of a curl and with a pair of great lenses staring at the light with cobraish lack of emotion.

Then the guy at the pom-pom decided that this was no time to write to headquarters about the matter. He let fly. The din was terrific as the weapon's eight barrels pounded like pistons and a stream of midget shells poured through the door gap. The invading creature appeared to dissolve before our very eyes, bits of rended metal, broken glass and empty shell cases flying in all directions.

It had no sooner gone than another was there, peering into the inferno without a blink. Same square end, same copper antenna, same cold, impartial orbs. That, too, flew to pieces. Another and another. The gunner was wild with excitement and busily cursing one of his left-side feeders for being slow at the loading rack.

A brief silence followed the wrecking of the fourth invader, a silence broken only by the clatter

of new ammunition belts being draped around the pom-pom.

"Well, they can't play hell about this," murmured Captain McNulty. "Not after snatching my men, not to mention the lifeboat." He seemed to derive much comfort from the thought that his conscience was clear.

Somebody pounded down a passage, came into the lock and said to McNulty, "Number three light just caught Drake and Minshall. They've been carried off."

"They're out of the way, then? Good!" His expressionless eyes on the gap, Jay Score stood jiggling an atomic bomb in his right hand. He did it with horrible nonchalance, up, down, up, down.

"Don't do that, Jay!" protested someone.

Jay glanced casually around to see who was stroking the rabbit's foot. His eyes were cold, cold. He thumbed the projecting stud, tossed the bomb through the gap to outer darkness. Everyone tried to push his own face through the floor and dig down to bare earth, McNulty included.

Came a vivid, greenish-blue flash followed by a mighty roar that rolled the ship back onto its opposite atmospheric fin. There were several slow heaves as of an earthquake. A mutilated length of metal tentacle came in from outside, going *whoo-whoo* with sheer speed, and cracked against the wall. Something faintly resembling the big end of a telescope ricocheted off the pom-pom shield, zipped over the crouching skipper's plump, up-lifted beam, skinned one of my ear lobes, scored a long, yellowish mark along the steel floor.

If we expected more and lengthier silence outside, we were mistaken. The reverberations of the explosion had hardly died away when a noise of violently torn metal came from the *Marathon's* stern, clanking feet and clattering claws hammered inward. Way back, somebody yelled bloody murder, choked, gurgled.

Things surged full pelt into the lock as we turned to face this new assault. The pom-pom gunner stuck to his post and, ignoring what was taking place behind his back, concentrated on keeping the outer door gap clear. But through the mutilated stern and down the passages and catwalks a metallic zoo poured upon us.

The next two minutes passed like two seconds. I saw a wheeled globe whirl into the room, followed by a nightmare assortment of metal things, some with jointed legs and pincer-armed front limbs, some with tentacles, some with a grotesque assortment of outlandish tools.

A grabbing pincer glowed red-hot and seized-up at the hinge when a well-aimed needle ray found its weak spot. But its coffin-shaped owner pressed on, his projecting lenses staring glassily. In the hazy back-throw from the searchlight, I saw Wil-

son burn away a lens-collar before the thing snatched him up and held him, its lensless hole giving it a ruffianly appearance.

The pom-pom ceased its rabid yammering and fell over on its side. Something cold, hard and slippery coiled around my waist, lifted me bodily. I went out backward through the lock, carried high in the unrelenting grip of my captor. I saw a many-tooled monstrosity snatch up the struggling form of the skipper and bear him from the fray in like manner.

My last view of the melee showed a wildly gesticulating metal globe apparently floating toward the ceiling. It was fighting at the end of a thick, sucker-surfaced rope. McNulty and his captor blotted out the rest, but I guessed that one of the Martians had stuck himself to the roof and was busily fishing in the mob below.

At a fast jog trot, the thing that was holding me set off toward the dimly glowing horizon. Dawn was breaking, with sunup due in twenty minutes, and the landscape cleared rapidly. My bearer was holding me down upon the flat of his long, level back, a taut cable around my waist, a many-jointed arm constricting my chest and binding my arms to my sides. My feet were free to waggle around and my right hand still gripped a heavy needle ray, but I was held far too tightly to bring the weapon to bear where it would do any good.

A dozen yards behind, the plump McNulty was being borne along like a bag of meal. His carrier was different from mine, bigger, heavier, with eight double-jointed legs, no tentacles, but a dozen arms of various lengths. Four of its arms were holding down the writhing skipper, the two front ones were extended in mockery of a praying mantis, the rest were folded at its sides. I noticed that every now and again the contraption's grotesque copper curl would flip out straight like a chameleon's tongue, quiver questioningly, then abruptly screw up again.

We passed other machines. A large group of them were hanging around the *Marathon's* mutilated stern, big things, small ones, squat ones, tall ones. Among them loomed the automaton with the steam-shovel hand. It was sitting imperturbably at the end of a channel scooped from the ground below the bottom tubes. Half a dozen machines were just lugging out those tubes; the higher ones were already out, lying forlornly about like extracted teeth.

"Well," thought I, with a modicum of bitterness, "so much for Flettner! If that guy had never been born, I'd be sitting pretty aboard the good old *Upsydaisy!*"

The thing on which I was having a reluctant ride began to increase its pace, building it up to a sort of lumbering but steady gallop. I couldn't twist

round far enough to get a look at it for its grip on me was firm, unyielding and painfully tight, but I could hear the metal pads of its feet clattering with noisy energy on the semimetallic ground. All I could glimpse was the juiciness of a rocking leg socket from which oozed a faint smell of mineral oil.

Behind, McNulty's mount also accelerated. As the light grew stronger and I raised my head as much as I could, my straining eyes saw a veritable procession of burdened machines stretching back to the ship. It was not possible to identify the victims from my point of disadvantage.

A thrumming in the hazy sky drew my attention. Night had not sufficiently withdrawn her blacking hand, and I failed to see the rocketships, though I could follow their progress as steadily they boomed from south to north.

After more than an hour, my captor stopped and put me down. I ached all over. The sun was up by now and we were at the verge of a wide, smooth road surfaced with dull, lead-colored metal. A coffin-shaped object about seven feet long, the fantastic horse I had ridden on the flat of my back, surveyed me through its horribly unemotional lenses.

Still retaining its grip, it shoved me through the door of a waiting vehicle. This was a big, boxlike affair mounted on double tractors and had the inevitable copper antenna sticking from its top. I'd just time to note a dozen similar vehicles lined up behind when I was thrust into darkness. The skipper followed me half a minute later. Then Brennan, Wilson, a computer and two engineers. The skipper was wheezing deep down in his chest. The engineers were using an amazing mixture of Terrestrial, Venusian and Martian oaths.

The door banged and locked, the machine jerked as if prodded, trundled forward at considerable speed. It stank of oil. Somebody sniffed and sniffed then muttered earnestly in the gloom. I think it was Brennan.

Finding his automatic lighter, the skipper flicked it and we had a look around. Our moving prison was a steel cell about nine feet long by six wide. There wasn't even a ventilator and the smell grew to the unbearable pungency of the cat house at the zoo. Still sniffing and muttering, the offended Brennan raised his needle ray and started to cut a hole in the roof, so I got mine going and speeded up the glowing circle. The metal flowed easily and the severed plate dropped in a couple of minutes.

But the sky didn't show, no vision of fleecy clouds greeted us, no welcome flood of light poured down. Above the gap in the steel was a layer of dark-green stuff that our rays could not affect. We concentrated all we had upon it, without avail.

A try at the door and the walls gave no better

result. Green stuff again. The floor proved to be the weak spot. As our machine roared onward, we cut a hole in the floor, light sprang up through it, we found ourselves staring down at a spinning shaft and a section of running road.

## V.

With his gun pointed downward, Brennan said, "Mother, see what I can do!" He cut the shaft.

The machine stopped. We braced ourselves for a number one crash, but it didn't come. One by one, the following machines swerved and raced past us. Brennan and I continued to watch the hole in the floor while the others watched the door. McNulty and the computer had lost their rays, but one of the engineers had his and the other was clinging to a four-foot spanner with which—it was rumored—he frequently slept.

There was no way of telling whether our dogbox had a driver or whether it operated under remote control, but if the driver or anything else opened that door, we were all set to make a determined break. Nothing happened. We waited five minutes during which I wondered who'd been imprisoned in those overtaking machines and to what sort of fate they were being rushed.

Finally, we started enlarging the gap in the floor and were halfway through the job when something huge and heavy churned along the road, hit our machine a gentle bump. Came a loud, metallic click and the next instant our vehicle moved forward, first slowly, then faster.

The portion of road visible through the floor hole soon streamed past at a rate that put an end to all thoughts of escape by that way. To drop through would be foolhardy in the extreme—if we weren't chewed up by the tractors we'd be minced by anything that might be running close behind.

"This," remarked McNulty, "is very annoying."

"Annoying!" echoed Brennan. He put his face to the hole and enjoyed some uncontaminated air. One of the engineers snickered.

"I have lost a seven-hundred-dollar owl-eye camera," announced Wilson, irefully. His eyes tried to stab the thoughtful skipper to death. "It's more than annoying. I'll take it out of their metal hides first chance I get!"

"Here's your blamed camera," said Brennan, surprisingly. He came to his feet, handed it over, a midget mass of wonderfully made gadgets smaller than a cigarette pack. "You dropped it as you were lugged out. I caught it, stuck it in my pocket a moment before I was slung after you."

"You are my heart's delight," sang Wilson. He fondled the camera with loving fingers. "I sure was worried about it!" His voice dropped, he added, thoughtfully, "Yes, I worried!" I knew he was looking at me.

One of the engineers stared down at the section

of road flicking past below the hole. The broken shaft, of course, was still, unmoving. "We're being towed. If I was sure that nothing is following us right behind— Hey, sit on my legs while I push my head through and have a look."

"No you don't," snapped McNulty. "We're going too fast to get out. We'll stay together and wait events."

So we sat on the floor, our eyes on the circle of light that was the hole, our backs to the cold, hard walls. Somebody dug up an air-tight can of cigarettes, got it open by means unknown, handed it around. We smoked in silence.

Eventually, our vehicle stopped and a multitude of clankings and grindings sounded all around us. The whole machine shuddered as an unseen enormity lumbered by on one side and shook the ground with its weight. On the other side, something purred like a dynamo and approached the door. We were all standing now, alert, wide-eyed, those who had ray guns holding them ready.

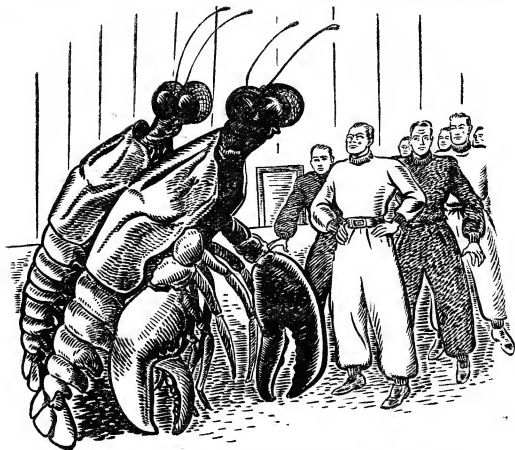
With surprising swiftness the door clicked, opened, and a big, multijointed metal arm reached through and felt around. The way it did it reminded me of a pet-store dealer feeling for white mice. I was still gaping at that shiny arm, my needle lined on its backmost joint, when one of the engineers ducked under it and dived through the door, whooping defiance.

That fantastic limb was just about to fasten on the skipper when the joint seized and the thing lost its flexibility. It withdrew stiffly, awkwardly, just as the second engineer charged after the first. This was the guy with the four-foot spanner. The silliest thoughts occur to you at the most inappropriate times, and I remember that, as I followed the computer and McNulty close upon this fellow's heels, I was thinking that I couldn't remember seeing him ever put down his spanner or let go of it for one moment.

Outside, the battle was short and sharp. We were faced by about forty machines of at least eight different types. Half a dozen of them were no bigger than dogs and did nothing but buzz around looking at everything that was going on. The biggest was a monstrosity larger than a Pullman car and had one telescopic arm ending in a huge, black disk.

Five yards from the door, struggling in the grasp of a many-armed coffin, the engineer who'd got out first was trying to burn away the contraption's nearside lens. The guy with the spanner had tangled with a wheeled globe and was battering ineffectually at the universal joints from which its writhing tentacles sprouted. He was cursing with much fluency and great violence.

On the left, a tall, idiotic gadget that looked like a surrealist's notion of a giraffe was running away with McNulty. It had four arms that tightly em-



*"But it's highly immoral to escape!" the lobsterish creature protested.*

braced the luckless skipper, four legs that moved in an ungainly swing, and a greatly elongated neck from the top of which shone a single lens. Still full of life, the skipper was putting up a futile struggle.

Its front limbs thrown out in mock affection, a glassily staring coffin thumped forward to embrace me. It moved with that dull, heavy *dum-dum-dum* like you hear in Africa when a rhino's making for you. A belly-fluttering sound. It smelled like the others, of warm machine oil.

I stepped backward beyond what I thought was its full reach and the thing promptly slid another twenty inches of joint from its metal body and nearly snatched off my unwary head. I went down in the nick of time, felt its bear-trap hand swipe across my top hairs.

There was something ghastly about the silence of this fight. Our opponents made no sound that was in any way vocal. Except for our oaths and grunts there was only the smooth purring of their internal works, the swish of metal tentacles, the occasional clank of a jointed arm, and the weighty thud of metal feet.

My opponent snatched downward as I dropped, but I rolled as I'd never rolled before, dodged both its grab and its pounding legs. My needle ray dug at its flat underside and did no good whatever. Rolling clear, I shot to my feet, glanced to the right, saw the computer's body lying in one place, his brains in another. I felt sick.

As I swung to watch the coffin, the Pullman thing—which had done nothing up to that moment—turned its disk toward me and bathed me from head to feet in a powerful beam of pale-green light. Theoretically, as I discovered later, that beam should have jammed my radio animation, but since I had animation of my own the device remained nothing more than a pale-green light.

The globes were the speediest of all this crazy assortment and it was a globe that got me in the end. My coffin-shaped opponent lumbered around to have another go at me, another coffin galloped upon me from the left, and as I tried to keep my attention upon both, a globe nipped in from behind and laid me out. At one moment my ray was pouring its thin blaze into the body of the nearest oncomer, and over its sights I had a view of McNulty and the giraffe retreating far behind my attacker's back, then—*thunk!*—the universe exploded in my head, I dropped my weapon and collapsed.

McNulty called the roll. Tattered and weary, but his plump little form still in one piece, he stood with his shoulders squared back and looked us over. Jay Score was at his side, big and solid as ever. His stallite chest stuck out through the shreds of his uniform, but his eyes glittered with the old, everlasting fire.

"Ambrose."

"Here, sir."

"Armstrong."

"Here, sir."

"Bailey." No reply. The skipper glanced up, frowning. "Bailey? Does anyone know what's happened to Chief Steward Bailey?"

Somebody said, "Haven't seen him since just before the fight on the ship, sir." Nobody added to this information.

"Humph!" McNulty's frown deepened. He ticked his list and carried on. I was puzzled as I looked over our mauled but still tough gang. Something missing, something missing. But either the skipper hadn't sensed it, or else he was ignoring it, for he proceeded methodically with his task. "Barker, Bannister, Blaine, Brennand . . . Brennand." Again he looked up as there came no response.

"Brennand was in our machine," I reminded him. "We dived into the fight, with you. I don't know what happened to him."

"You can't say definitely that he's dead?"

"No, sir."

"Brennand never came out of that machine," offered a voice. Looking across, I saw it was the gentleman with the spanner. He was standing beside the eyebrow-wagging Steve Gregory, and his face looked like a half-eaten orange, but he was still holding his tool. Maybe they'd let him keep it because they thought it was part of his arm. "I was the last to conk out in that free-for-all. Brennand wasn't in it. Neither was Wilson."

McNulty looked bothered; Jay Score faintly interested. The skipper made two marks on his list and carried on. It wasn't until he got down to the letter K that I discovered the missing factor which was worrying me.

"Kli Dreen, Kli Morg, Kli . . . where's Kli Dreen?"

We all stared around. Not a Martian, not one of them. Kli Yang, Sug Farn and the rest, nine in all, were missing. Neither could anyone recall seeing them after the battle in the *Marathon*. The last man out of the vessel had been Murdoch, a government expert, and he swore that all the Martians had remained behind, still fighting. Leastways, they hadn't been tossed into his vehicle which had been at the back of the line of those waiting on the road.

There was no way of explaining why the Martians had been able to resist longer and more successfully than we had done, nor any way of telling what had happened to them since that time. Maybe their enormous strength had prevailed even against the metal monstrosities. My private guess, which I kept to myself, was that they'd managed to get their foe crazy about chess and were still keeping them waiting there for someone to move

a pawn to king's fourth. They were quite capable of a stunt as lopsided as that.

Marking off all the Martian names, McNulty continued to the bottom of his list, omitting Sixth Engineer Zeigler in the same way as he had omitted Chief Andrews. These two were known to be dead—they'd gone down before that onslaught through the stern. Summing up, he found seven dead, five missing, not counting the Martians. The missing consisted of Haines and his two men in the lifeboat, also Brennand and Wilson. This was a serious loss to our small company, and our only comfort lay in the thought that the missing ones might still be alive.

I took stock of our prison while the plump little skipper mooned sadly at his list. We were in a metal barn, a great, bare place a hundred feet long by sixty wide by forty high. The walls were smooth, drab-colored, windowless. The roof was deeply curved, equally drab, devoid of opening, but from its apex hung three large spheres of translucent plastic that glowed with orange light. Closely as I examined the walls, I could not find upon their dead flat surface a single line or solitary flaw suggestive of a butt weld or any other kind of joint.

"Well, men—" began McNulty.

He got no further. Thinly, eerily, a long-drawn scream trickled through the fine cracks around the building's only door. It was a high-pitched sound, thrust up to the very peak of agony, and it was chased by mocking reverberations as if it were making frantic escape down a long, metal corridor. Above all, it was a human voice—or the voice of what was left of something human.

## VI.

The men milled around, their foreheads glossy. Murdoch was sheet-white. Sam Hignett's black fingers were closing and unclosing as if they itched to come to the aid of the sufferer. The guy with the spanner had rolled up his sleeves and revealed a tattooed nautch dancer on the muscle of his lower left arm. The dancer shimmied as he altered and tightened his grip on the spanner. His face still looked like hell, but his eyes were hard.

Slowly, monotonously, Jay Score said, "If we had the handling of one of those animated gadgets, we'd drag it to bits to see what makes its cuckoo call the hours." He stared blankly at nobody in particular. "In that respect they may resemble us. Any man who doesn't fancy being picked to pieces had better take care they don't get him out of here alive!"

Again the scream. It broke off abruptly the moment it reached its top note and the silence was infinitely more horrible than the noise. I could imagine them now, clicking and whirring as they moved around, looking for the fleshy apparatus

that had made the noise—their metal claws smeared with red.

"Are there any acrobats in the house?" asked Jay.

He walked to the wall, planted his big hands against it, braced his feet on the floor. Armstrong, a powerful six-footer, scrambled up him, stood on his shoulders. That much was easy, but the rest was not. By dint of much clumsy struggling we got Petersen's feet firmly set on Armstrong's shoulders. Petersen's head was now about fifteen or sixteen feet up. No matter how we tried we couldn't lengthen the ladder. Jay Score stood like a rock, but the wall offered no grip permitting his double burden to steady themselves as another tried to top them. We had to give it up.

No doubt about it, Jay could have propped the seven needed to reach the roof, assuming that Armstrong could bear his six. I could see no point in trying for the roof. All the same, this futile effort did serve to occupy our minds.

Somebody tried a needle ray on the wall with the obvious notion of cutting a series of steps, but this was stuff much different from that with which the vehicles were built. It heated up all right, turning primrose color at maximum temperature, but it refused to flow or be cut.

The attempt with the ray gave the skipper the idea of making an inventory of weapons. There proved to be seven ray guns, one ancient vest-pocket automatic pistol which its owner claimed had been used by his father in the Final War, one four-foot spanner, two tear-gas pencils. The ray guns had proved to be a fat lot of use against our armor-plated opponents and the rest of the stuff was mere lumber. But the inventory revealed one interesting angle of the psychology of our foe in that anyone who'd clung grimly to a weapon had been allowed to keep it—which suggested they didn't know weapons when they saw them!

We'd just finished inspecting this futile armament when the door jerked open with swiftness that caught us napping and two lobsters were thrust headlong into the place. The door shut with a vicious clash, giving us not the slightest glimpse of the thing behind it. The lobsters skidded helplessly across a corner of the metal floor, brought up against a wall with a clash of horny armor. For a moment they lay there while we stared fascinatedly, then they got to their legs. Their heads were more insectlike than lobsterish for they had multiple eyes and butterfly antenna.

Whether they were surprised by seeing us is something I'll never know for without any hesitation they talked to us, not vocally, but with psychic speech that seemed to pop up inside our brains. Their weird mouths never opened, their palps never moved, but so effective was their projection of mental impressions that it was difficult to be-

lieve they weren't addressing us in good old everyday English. It was a feat very much like the iguana's.

One of them—I don't know which—said, "You are strangers! You are soft things, unlike the hard things of our solar system! Can you understand us?"

"Yes," replied McNulty, his jaw hanging. "We understand you."

"Sound waves!" Both turned and looked at each other, their delicate antennae quivering. I could almost hear the ejaculation mark at the end of their mental voices. "They communicate by the modulation of sound waves!" This seemed to dumfound them. They gazed at us as if we were impossible; then, "You are difficult to talk with. You do not assist with your minds. We have to push in our thoughts and pull out yours."

"I'm sorry," apologized McNulty. He swallowed, composed himself. "We're not exactly . . . er . . . telepathic."

"It is of no consequence. We are managing." Each of them made the same vague gesture with the same claw. Both regarded us impartially. "Well, despite our differences in face and form it seems that we are brothers in misfortune."

"Quite," agreed McNulty. The skipper was now beginning to regard himself as something of a universal contact man. "That's what I thought. What're they going to do to us?"

"They'll dissect you. They dissect all the individualistic. They've been doing it for years, trying to find the cause of independence. You see, they're intelligent machines, but their intelligence is purely communal. On our own world of Vargas there are tiny aquatics similar in type in that they are nothing remarkable as individuals but display high intelligence when functioning in organized groups. They share a tribal mind."

"Like termites," the skipper suggested.

"Yes, like termites," confirmed whichever of the two was talking—or was it both? I couldn't see how he, or they could agree on the termites until I remembered that what was on the skipper's mind had also been impressed upon theirs. "For many many trans-solar revolutions they have been trying to conquer our home planet, the neighboring water world of Vargas. Our people are resisting with fair success, but occasionally some of us are captured, brought here and dissected."

"They're only machines, though?"

"They are machines of a large number of functional types, all kinds of warriors, all kinds of workers, even experts and specialists. But they are machines." Suddenly, one of them pointed a dramatic claw at the silently watching Jay Score. "Just as *he* is a machine! He is made of metal and his mind is closed to us! We do not like him!"

"Jay's a damn sight more than a machine," said

McNulty, with some indignation. "He's got something no stinking machine ever had. I can't explain what it is, but . . . well . . . he's a person." A low, rumbling murmur of approval showed that he'd expressed the general opinion of the crew.

"What I've got is merely the general complaint," explained Jay, unsmilingly. "I've got independence. That makes me a candidate along with the rest." He sighed. "Guess I'll go the way of all flesh!"

McNulty grinned at this pessimistic sally, said to the abashed lobsters, "If you're sensitive to the thoughts of our kind, you might be able to tell us whether you can detect any human emanation from elsewhere. A few of my men are missing. I'd like to know whether they're still alive."

The pair of strange creatures from Vargas went quiet while their antenna trembled as if searching a portion of the ether beyond our range and comprehension. Something rumbled noisily along the corridor and passed our door without stopping, but they took no notice of the diversion.

"Our range is short, exceedingly short," said one of them after a while. "A mind like yours has gone, gone forever. It petered out even as we were conversing. There are no other minds of your type within our range." A claw pointed toward the roof. "But up there are other minds far stranger than yours, far different from ours. They are unique. We would not have thought them possible. They can concentrate upon two subjects at the same time."

"Ah!" McNulty scratched his head. He could make nothing of this information.

"Two subjects at once! It is unbelievable! They are high up, but descending toward the roof. One of them is thinking of a parade of little gods on a square of colored squares and is also thinking of . . . of you!"

"What?" yelled McNulty.

I saw Steve Gregory's scalp swallow his eyebrows as he followed the skipper's example and stared wildly upward. We all stared up. Next instant came a terrific thump that shook the place from end to end and a huge dent appeared in the curve of the roof. Something hammered violently on the roof, and other things made a metallic uproar in the corridor beyond the door. The combined noises were awful; I felt like a bug in a boiler with a dozen riveters at work on the seams.

Spanner was one guy with observation and initiative—he'd noticed that our door opened inward. With his hefty four-foot instrument in his fist, he stuck his other hand into a back pocket, proved himself tough enough to sit in comfort on two short, thick screwdrivers and a lump of metal like an ax head. These he walloped into the base of the door, performing the task with some difficulty, but finally managing to wedge the thing



securely. He'd only just finished when the uproar in the corridor increased and a great weight made the door groan.

It looked as if our time had come. Those clanking things outside were thirsty for samples to dissect. Our much-prized individualism was to be our downfall. On this basis, it struck me that Spanner and Sam Hignett probably would be chosen as the first to be carved. They'd want to know why Spanner had a half-metal, double-length arm, and why Sam had a black skin while all the others were white. I also wondered what would be their reaction when they got the measure of Jay Score.

The door groaned again, didn't turn on its concealed hinges, but did begin to bulge in the middle. Brilliant light streamed through the slowly widening gap between its top edge and the wall. Caterpillar treads rattled past outside while the thing thrusting at the door maintained its powerful pressure.

"Don't shoot until you see the whites of their eyes," grinned Spanner. He spat on the floor, leaned on his spanner like a waiting knight leaning on his mace. The pose made his nautch dancer look incongruous.

Came a terrific tearing sound from the roof, a great section of it came away bodily, sunlight poured through onto our upturned faces. A large, leathery, bulbous body with huge, sucker-surfaced arms tumbled over the ragged rim, clung with three of its snaking limbs, hung grotesquely in midair. It was Sug Farn.

Adding three more tentacles to those maintaining his overhead hold, he extended his remaining four downward. His full spread was thirty-two feet, and this was now reduced by his five or six feet of sucker-hold above. His tentacle tips dangled and curled enticingly a good fourteen feet from the floor. The door bent inward alarmingly while still Sug Farn hung there and we looked up at him with various degrees of hope and the lobster creatures stared at him aghast.

Then, suddenly, he came down another ten feet, snatched four of the crew, swung them up to the hole in the roof. They went like mahouts rising in elephants' trunks. Looking up, I could see that he had no longer any hold of his own, his upper tentacles being closely entwined with the equally ropy limbs of another Martian anchored on the top of the roof beyond our sight. Sug Farn lifted the four to within a few feet of the hole; other tentacles writhed through from above, took them from him. Four more and four more.

What with trying to keep my attention divided between this crazy performance and the creaking door I hadn't taken overmuch notice of the lobsters, but now I discovered that they were having a bitter argument with McNulty.

"Nope!" declared the skipper, firmly. "We don't

give in, we don't face the inevitable, we don't die with aplomb as you put it." He sniffed loudly. "We had a tribe of that kind on Earth. They celebrated their miseries with some nonchalant belly-slitting. They got no place. The Chinese swallowed them in the end."

"Nevertheless," persisted one or both of the lobsters, "escape is not done. It is dastardly. It is contrary to convention. You are defying the rules of war. A prisoner must maintain honor by accepting his fate."

"Bunk!" snorted McNulty. "We're not on parole. We've made no promises." He watched another four sail upward.

"It is wrong, utterly wrong. It is disgraceful. A captive is always lost forever. Why, our own people would kill us from sheer shame were we to get away. Have you no conscience?"

"But, damn it!" shouted McNulty, "your rules are idiotic. We don't subscribe to 'em. It's perfectly legitimate for us to—"

"Listen," interjected Jay Score. His grim, glowing eyes shifted from the expostulating skipper to the door. "Isn't this a hell of a time to debate different codes of ethics?"

"Sure, Jay, but those hard-shelled dunderheads—ouch!" His surprised expression was comical as the imperturbable Sug Farn got him and swept him to the ceiling.

The door gave in, bursting with a sound that tore our ears. Not counting the defeatist lobsters, there were seven of us still waiting on the floor when the door collapsed and a thing like a fifty-ton tank rumbled headlong into the room. A clicking, whirring mass of coffins, globes and other nightmarish contraptions pressed hard behind it. The leading invader was so big that it filled the large doorway with only a couple of inches to spare. Fascinatedly, too fearful to move, I watched its great caterpillar treads streaming downward and under as it lumbered upon me, an alien juggernaut.

## VII.

His black features curiously alight, Sam Hignett yelled at Sug Farn, "Me last!"

Our Negro surgeon might have got his wish, but he counted without the tentacled individual dangling overhead. A speedy globe got through the door, beat the juggernaut along the floor, grabbed at Sam. It was half a second too late. Silently, without comment, Sug Farn released three of his clinging arms from above, garnered all seven of us and heaved us beyond reach.

I soared slowly to the hole, could feel a subtle trembling in the limb gripping me as Sug Farn strained to raise the big burden. Another limb reached down, curled round me, took the weight. As I went through the hole I caught a glimpse of another Martian figure crawling along the under-

side of the dented roof toward the top of the nearer wall, then I was in the sunlight and on my feet.

Sitting in the dent like a mud hen in its hollow was the pinnace. There the powerful little vessel rested, its tubes ready for action, its smooth, streamlined shape a thing of delight. No vision could have done more to raise the spirits of weary men.

Metal buildings stood all around us, most of them with roofs a little higher than the one on which we were standing. All were square or oblong in plan, all without windows or decorations of any sort, all severely utilitarian. No smoke arose from any point within view, but puffs of steam came from several invisible sources. Several of the buildings bore great, latticework radio masts; a few had complicated dinguses like directional antennas. The place was a metal metropolis.

Below us, wide, straight, evenly spaced streets were filled with scurrying machines of at least a hundred types. Most of them resembled nothing we had yet seen; one in particular, a long, semi-flexible contraption reminded me of a monster centipede. It had a triple row of revolving cutters projecting from its front and evidently was some sort of tube borer or subterranean excavator.

A small proportion of coffins and globes were evident among the crowd, with a couple of giraffes and some of those small, inquisitive, seemingly useless gadgets that had got under our feet during the last affray. Somehow, I got the notion that the tubes and coffins were different types of warriors, the giraffes were police, and that the nosy little machines were cub reporters who kept constant observation and transmitted constant reports either to some co-ordinating center, or perhaps to the community as a whole. I didn't feel too sure about those giraffes, though.

While two-thirds of the rescued crew clambered into the pinnace, giving it a full load, I stood with Jay Score on the ragged edge of the hole in the roof and looked down into our former prison. It was an amazing sight. The pair of lobsters had gone, presumably to their expected fate, but directly below us, squatting like an enormous toad in the middle of the floor, was the fifty-tonner that had burst in the door.

Around it, glassy-eyed globes trundled hither and thither, occasionally waving their ineffectual tentacles at us. Several coffins had closed their jointed back legs and were sitting and staring up at us in fantastic imitation of a pack of balked hounds, their forward lenses having gained enough tilt to bear upon the hole in the roof. Despite their total lack of facial animation, I could almost see their tongues hanging out. Some of the moving machines made a continuous clicking and clanking. Their oil smelled to high heaven.

Thirty feet above them, Sug Farn and Kli Yang

had stuck themselves securely to the tops of opposite walls and were busily fishing in the mob below. Sug Farn snaked out a tentacle that looked as if it could anchor a battleship, spread the end suckers on the flat back of a squatting coffin which, judging by its posture, was patiently waiting for us to drop like overripe grapes. Sug Farn lifted the coffin which immediately whirled and waved its jointed legs. An alert globe whirled to its rescue.

Kli Yang took the globe with all the unconcerned ease of a chameleon tongue-swallowing a fat fly. The coffin arose into the air, dropped on to the back of the fifty-tonner, crashed thence to the floor with a horrible rattle of internal works, lay motionless. The globe, which was lighter, went up fighting madly in the grasp of the powerful Kli Yang, then was flung on top of another globe. The flung one went dead. The struck one went crazy and proceeded to race round and round in a narrow circle.

Looking longingly at the fifty-tonner, which continued to squat with all the indifference of a dumped flivver, Kli Yang remarked to us, "This is how we won the fight on the ship. We stuck to the ceilings, picked them up, dropped them and left the rest to nature. They can't climb, neither could they get into the *Marathon* machine long



enough to reach us." With one saucer eye on me and Jay, he rolled the other downward. His independent swiveling always did give me the creeps. To Sug Farn, he said, "Kli Morg ought to have sacrificed his bishop."

"Yes, I'd just reached that solution," agreed Sug Farn. "Morg tends to err on the side of economy in his games." He sighed, said, "Watch this!" and made a swift snatch at a gesticulating object that seemed a mass of tools, got it by a big, knobbed projection in its front, hurled it against the base of Kli Yang's wall.

*Whoom!* Heat bathed my legs as the pinnace blew free, leaving eleven of us on the roof and the double-minded Martians amusing themselves below. I turned and saw the little vessel curve away to the north on a stream of thunder and fire.

"They'll be back for us—if we're still here." Jay's fiery optics gazed down at the Martians and the metal pack. "Kli's wrong in suggesting that there are no climbers. How did they erect these buildings?"

"None of those can climb," I argued, indicating the horde beneath us.

"No—but I reckon they've got some sort of erecting machines stowed away somewhere, a kind of mechanical steeplejack. They'll probably haul them out as soon as they get over the problem we've handed them by our gross defiance of their laws of war." He pointed to the surrounding streets in which no excitement was yet evident. "It's taking a long time to sink in. I doubt whether a prisoner has ever broken free within their memory, if they've got memories. They're balked by a situation they can hardly comprehend."

"Yes, we certainly are dealing with a totally different kind of mentality," I agreed. "Seems that they're too conditioned to meet the abnormal." I didn't mention it, because Jay was too much of a personality, but I felt that he had a slight advantage over us in looking at things from the viewpoint of our opponents.

Kli Yang crawled up through the hole, followed by Sug Farn. The latter looked around, settled himself in the dent made by the pinnace, wrapped himself up in his own tentacles, and went to sleep. He proceeded to emit soft, high and long-drawn-out whistles.

"Sleeping," complained Kli Yang. "He can't do anything without grabbing himself a sleep on the strength of it." Keeping one disgusted eye on the snoring Martian, he turned the other to Steve Gregory. What with his eyes, and Steve's eyebrows, I began to wonder what talents I'd got. "I suppose," said Kli Yang, gloomily, "it never occurred to anyone on the pinnace to leave the chessboard behind?"

"Nope, it didn't," Steve admitted.

"It wouldn't!" grumbled Kli Yang. Edging

away from us, he fished out a tiny bottle of *hooloo* scent, sniffed at it delicately. I guess the twelve-pounds pressure was getting him down—I never did believe those Martian descriptions of human odors.

"How did you know which building we were in?" Jay Score inquired.

"We came zooming over," Kli Yang told him, "with little hopes of finding you in this jumble of edifices. We circled around several times, and were surprised by the fact that the mob of things below us took not the slightest notice of us. Eventually, we spotted that line of parked vehicles with Brennand and Wilson standing on the top of one signaling frantically—so we landed on this, the nearest roof. Our landing was made somewhat clumsily because the pinnace is hard to hold with controls made for human hands."

"Brennand and Wilson are safe, then?" I put in.

"Yes. Kli Dreen yanked them up and got them into the pinnace. They said they'd escaped from their vehicle through a hole in the floor, after which they were completely ignored. They were still amazed by the way in which they'd been left alone."

Jay looked at me, and said, "See—escapees! Nobody knew what to do about them. They were a new factor, a denial of local ethics." He walked to the edge of the roof, his crêpe-rubber soles bearing his weight silently on the smooth, metal surface. There was another roof adjoining, on a slightly lower level. He stared down at it, his eyes glowing brilliantly. "Those screams came from somewhere under there. Come on, let's see if we can raise a corner and have a look."

He dropped four feet onto the lower roof, followed by Armstrong, me and the others. Together we heaved and strained at a lapping corner. It gave way, coming up with unexpected ease. That metal was darned peculiar stuff; it was fairly hard, impervious to heat, yet bent easily as if along the line of a hidden grain. No wonder the Martians had been able to rip a hole in the roof.

Peering through, we found beneath us a long, narrow room that might have been either a laboratory or an operating theater. It was filled with apparatus of all kinds, including radiant lamps, sterilizing chambers, trays of instruments, wheeled tables, and an assortment of junk strange to our eyes. Half a dozen superbly finished and highly polished machines were busy in the room, their shiny, unemotional lenses intent on their tasks. They were tall, profound creations with dexterous digits. What they were doing made me feel sick.

Two lobsters were all over the room, half of one on a far table, two heads on another, a mass of innards on a third. Whether they'd been the two with which we had talked, or whether they were another pair it was impossible to tell. But the

machines were fooling around with the bits, putting parts under microscopes, sticking lumps into various kinds of apparatus.

The lobsters had no blood, but their mutilated oddments exuded an oily, colorless juice. All the same, there was crimson on one of the unoccupied tables, crimson on the floor, crimson spattered over a couple of the metal vivisectionists. In a wire basket, carelessly tossed aside, lay a pair of human hands. The left hand, white and flaccid, still bore a gold signet ring. It was Haines' ring!

Armstrong cursed violently, and said, "God, what wouldn't I give to be able to blow the entire place to bits!"

"Nothing we can do—yet," commented Jay Score. "We're too late to save anyone." He gazed across to the next roof which was on the same level and about twenty-five feet away. Like the outpiece on which we were standing, it projected from a higher roof surmounted by a tall radio mast. The twin antennas ran to another mast a hundred yards to our left. "I can jump that," Jay murmured.

"Now take it easy," advised Armstrong, looking over the edge. "Wait until the pinnacle gets back. If you flop into the street, you'll be converted into a thousand souvenirs."

Returning to the hole in our roof, Jay stared through. "They're still waiting," he reported, "but they won't wait forever. They're liable to go into action before long." He came back, the rags of his uniform flapping around his great stallite legs. "So I'll have a little action of my own."

Before we could prevent him he'd measured his pace and started. There was no stopping him once he was on his way; his solid and powerful three hundred pounds were far too much for human muscles to oppose. Kli Yang, perhaps, might have done it, but he didn't try.

With a superswift and well-timed run, Jay shot off the rim of our roof, arced steeply over the intervening street, landed with a good three feet to spare. A second, easier jump carried him to the higher level. He reached the lattice mast, went up it like a monkey, tore the antenna down. Then he came back. The same spectacular leap performed with the same margin.

"Some day," suggested Kli Yang, "you'll get yourself electrocuted—if you don't break your neck." He gestured to the street. "It may be coincidence, or it may not, but some of those machines have quit moving."

It was true. Amid the hurly-burly below a number of automatons had become as lifeless as statues. They were all of the same type. Other types were unaffected and were jostling past as of yore. Coffins, globes, wormlike things and large, lumbering monstrosities all went about their business as if nothing had occurred, but the few specimens of

this one particular kind—an egg-bodied, spindle-legged affair—stood as if petrified in their tracks.

"I'd say they've radio animation," ventured Jay. "Each type has its own band and its own station." He pointed to other masts sticking up all over the city. "Maybe if we could put those out of action we'd stiffen the lot of them—all except their radio-service squad, which promptly would come to life!"

"If their radio mechanics look anything like an ambling lighthouse," someone interjected, "there's one on his way already!" He jerked an informative thumb to the northward.

We looked and saw it. The object coming down that road was fantastic in the extreme. It consisted of a long metal platform running on huge wheels ten or twelve feet in diameter. From the center of the platform arose a gradually tapering tubular body that terminated in a many-lensed, many-armed top piece more than sixty feet from the ground. The thing looked taller than a fire tower and not only dominated the street but also surrounding buildings.

"Clap hands—here comes Charlie!" said the gentleman who owned the ancient pistol. He was gripping the weapon with some determination. Compared with the oncoming colossus, the pistol looked pitifully absurd.

"An erector, I think," Jay watched it coolly, calmly. "But he's coming to pick us off!"

They all seemed damnably nonchalant about the matter. Perhaps they were trying to conceal feelings like mine. As the tremendous menace rumbled slowly and inevitably nearer, my stomach shrank to a small, hard ball. Down in the streets still roamed the mechanical horde. Below the hole in the roof waited another hungry pack. Jay might be able to get away by means of his mighty leaps from roof to roof, but the rest of us could do nothing but wait like doomed steers in a slaughterhouse.

Then a dot appeared in the sky and a high whine showed that the pinnacle was coming back. A swift little bullet, it was diving in at full pelt. As near as I could judge, it was likely to reach our roof slightly ahead of the threatening tower, but I doubted whether it could land, open its lock, take us aboard, and blow away before the trouble started. Our pulses working overtime, we watched the rapid onrush of the pinnacle, the seemingly invincible forward trundle of the super-sized foe.

Just as I'd decided that half of us might make it at the expense of the other half, those in the pinnacle must have seen the advancing tower. The vessel made no attempt to land. Making a crazy half-turn, and rocking laterally, it shot over us with a rush of air, cut across the head of the tower now a bare one hundred yards away. An atomic bomb must have dropped, though I didn't see it.

"Down!" rasped Jay Score.

We flopped on our faces. Something whooped to high heaven, our building swayed, stuff fountained upward from the street. For a few seconds there was an eerie silence broken only by the composite clankings of the metal population and the receding howl of the pinnace, then came a great crash as the tower fell on its own face. The building shivered again.

Getting up, I saw the tower reposing full length in the street. Its platform was a wreck, its long, tubular body twisted and distorted, its armed and lensed head battered and devoid of animation. The juggernaut had put "paid" to a dozen smaller machines in its collapse.

"Damme," chirruped Sug Farn, waking hastily and stretching his tentacles, "what's all the row? Are they at it again?"

"Get out of that dent," snapped Kli Yang, "and make room for the pinnace."

Without haste, Sug Farn moved over to one corner in which we formed a tiny, hopeful group. Swinging round in a shallow curve, the pinnace settled down, landed. The dent in the roof went slightly deeper under its weight. But for the supports beneath the roof, and the expertness of the vessel's landing, the little ship might have burst clean through the roof, carrying us all into the eager hands of the enemy.

We piled in thankfully. The skipper wasn't aboard, neither was Brennand. Second Navigator Quirk was at the controls and had a crew of five Terrestrials and one Martian, the absolute minimum for a vessel of this size. The Martian was Kli Dreen. He didn't say anything to his fellows as they squirmed aboard, merely stared at them and sniffed.

"I'll bet twelve international dollars," observed Kli Yang, acidly, "that your underworked brain never thought of bringing our low-pressure helmets so that we could get out of this infernal stink?"

"Hear him!" appealed Kli Dreen, swiveling one eye toward me. "He explores the universe, then complains about a little pressure!" The eye rolled back, and he added, triumphantly, "Kli Morg would have won if he hadn't tried to save his blishop."

"Hah-ha!" Kli Yang laughed with artificial violence. He tried to wink at Sug Farn and failed. The Martians were always trying to imitate the knowing wink used by Earthmen despite the dismal fact that it can't be done without eyelids. "A week late, as usual!"

I found young Wilson standing at the forward port, near Quirk. The inevitable camera was in his hands and he was fairly drooling with satisfaction. Two more cameras were jammed in holding straps on the wall, one of them an instru-

ment with a lens the size of a saucer.

"Oh, sarge," he yammered at me. "Shots, shots, shots—dozens of 'em!" His face was magenta with glory. "And I got that tower thing just before we bopped it. Watch me get these two!"

Peering over his shoulder, I looked through the port. Sure enough, two more of the lofty erections were coming down the street, one rumbling along behind the other. Back of me, I could hear our lock door winding home.

Suddenly the pinnace stirred, swept upward under Quirk's expert hands. No Martian could handle 'em with quite the same touch. Wilson snapped joyously. I went in search of Jay Score, found him prone by the little bomb hatch in the belly. He had an atomic bomb, and released it just as I found him. I stuck my face to the nearest port, saw the building adjoining our former prison bulge at the walls and throw its roof away. The inside must have been a shambles.

"So much for their operating theater," growled Jay. His eyes bred sparks. "That one took *them* apart for a change."

I could sympathize with his feelings, but, darn it, a robot isn't supposed to experience so human an emotion as a thirst for revenge. Still, nobody ever cared to show Jay their surprise at his rare moments of sentiment. By all the laws, he wasn't suppose to have any more emotion than a dummy—but the fact remained that he had, in a cold, phlegmatic sort of way.

"McNulty won't like that," I pointed out. "He'll say that, despite our losses, the Terrestrial authorities will call it unnecessary destruction. He'll let his conscience nag him."

"Of course," agreed Jay, with suspicious ease. "I didn't think of that. What a pity!" His voice did not alter its inflection in the slightest degree, and his face, of course, was completely without expression. His thoughts were as easy to read as those of a stone juju.

He went forward to see Quirk. Just afterward, we made a series of swoops as we drummed northward. Each swoop brought a fleeting twang from outside, so I had another go at the port, found we were busting a few antenna on our way. I didn't need any ESP to know that Jay had a hand in that performance.

Steadily the great metropolis rolled beneath us, its road dotted with scurrying machines and some that were stalled. Back in the distance I could just make out the pair of towers. They were still moving and now almost up to our recent sanctuary. One-track minds. They'd been ordered to do their stuff and were still on the job a minute after we'd gone.

That city covered ten square miles and all of it metal. Out here, in the suburbs, the egg-bodied types were still in repose along with three other kinds, and I could see occasional individuals hors

de combat on the wide arterial roads leading to the north and south. *Whang* went another antenna, then we soared up to twenty thousand feet. On the south horizon, a second city revealed the faint outlines of its buildings and masts.

Like a beautiful golden spindle, the *Marathon* lay on the black and crimson surface. Most of her crew were busy at her stern. The pinnacle dived down, landed alongside, and we poured out. It wasn't until that moment I realized that my belly had been empty for hours.

We heard the story over a quick meal. The Martians had held off all attacks until the remaining globes and coffins withdrew. These had posted themselves at a distance from the ship and waited—either for the Martians to come out, or more probably for some new type of machines to come up. The Martians had seized the opportunity to blow free in the pinnacle and had seen their besiegers swarm into the abandoned vessel the moment they left. But, except for wrecked specimens, the horde had gone by the time the pinnacle came back.

"You know," pondered Jay Score, "it looks as if motion is their definition of life. It moves, therefore it lives. The *Marathon* has no animation of its own, so they considered it as being no menace in itself. They were after the crew. When the crew were all gone, they bothered no more about the ship." His eyes ran over us speculatively. "If you're cornered, and stand perfectly motionless, they might leave you alone. Yes, they might. But if you move, they're after you!"

"I wouldn't care to try that no-motion stunt," said a voice, dryly. "Give me my feet every time."

"Wonder if they'll attack again, before we've made repairs," I put in.

"There's no knowing. They've a most curious mentality, in my opinion," Jay went on. "They accept the familiar, are immediately hostile to the unfamiliar. The vessel, I think, was attacked because it was an unknown interloper. By this time, it may be recorded on their communal mind as a known wreck. It won't be until passing machines report unrecorded activity here that the mind will connect this with our escape, ponder what ought to be done about it, then do it." He looked through a port toward the distant hills and the settling sun. "Guess we'll have to move fast."

Beating it outside, we lent a hand at the tough job of resocketing the stern tubes. It was a hell of a task, using an inadequate derrick and manhandling the great pipes into position. Meanwhile, the Martians were making a classy job of repairing the torn stern. Engineers were going over the combustion chambers, three more were making good the damage done in the nearby air lock, mostly by the pom-pom.

Quirk took the pinnacle over to the far road while we were at this. The skipper didn't want him to risk it, but Quirk hung high in the clouds until the road was temporarily free, shot down, found the missing lifeboat. Three of his crew brought it back, together with the bodies of Haines' two companions. As far as we could tell from the evidence, the lifeboat had landed in friendly fashion, with Haines unaware that a waiting Pullman had blanked out his radio. Haines had been captured, the others had gone down fighting, and had been left—motionless. We buried them in the evening, with Chief Andrews and the others.

Long after dark the brilliant blue flickers of the Martians' welding machines cut through the night and steady hammering came from different parts of the vessel. We were advertising ourselves, and no doubt about it, but risks have to be taken. All this time, McNulty alternated between expectant gloom and high spirits. The former, I reckon, was due to anticipation of another attack coming before we'd finished. The latter might have been because of our prospective escape, or perhaps because we had a cargo of astonishing specimens in the shape of three smashed globes and two wrecked coffins. Our attackers had borne away all the remaining junk.

At two o'clock the following afternoon the job was finished without interference and we blasted off. Down in the hold the government experts were still gloating over our load. Soaring miles high over the scene of our troubles, we reached the second city in the south, landed near its outskirts.

"Here, we're a new factor," said Jay Score. "See how they take it."

I timed it with my watch. The attack came in exactly thirty-seven minutes.

The local technique was different. First of all, the cub reporters came along, inspected us with many skitterings around, then scrambled back to the city. Next, a dozen Pullmans waddled up, aimed their disks at us, bathed the entire vessel with their rays. Steve Gregory immediately shot out of his room and complained that his radio had gone haywire. He illustrated his trouble by oscillating his brows.

Outside, more forces joined the disk wielders. Things with enormous hands, things with a multitude of built-in tools made for our stern. The inevitable array of coffins and globes scouted around. Two giraffes turned up and unknowingly posed for young Wilson. By that time, the skipper decided that we'd waited long enough and had better not give the contraptions at the stern time to meddle. With a terrific *whoosh* that misted the landscape, we blasted away and shot skyward, leaving them all defeated.

Twenty minutes afterward we plunked down within easy reach of a wide but little used road and waited for something to come along. The first comer was a galloping coffin with eight steadily thumping legs, four folded arms, two tentacles in front, and its idiotic copper curl unwound and sticking up stiffly like a solitary hair. Half a dozen of us barred its progress, our ray guns aimed more as a gesture than anything else. They weren't a threat, as we knew by now.

It was all Jay's idea, to which McNulty had consented with some reluctance. The skipper had agreed to this ambush only on condition that we arranged it near enough to be covered by one of the *Marathon's* pom-poms. I could see the weapon's eight barrels peering out the near lock as the coffin slowed its pace, then stopped.

Six more of the crew got into the road behind the coffin, another four covered the side opposite the *Marathon*. The coffin looked us over, its lenses hard, expressionless, its copper antenna quivering questioningly. I had the feeling that its horde knew about its predicament and probably were already summoning the riot squad. I also knew that if it chose to charge, we couldn't stop it. That metal mass could go through our ranks like a knife through cheese.

For a few breathless moments, the alien entity stared at us and we stared back at it. Then it lumbered around preparatory to beating a retreat, found itself cut off, turned to face its original direction. We looked at each other until the silence became unbearable. Still the thing did not stir a limb.

"As I thought, just a metal hick," said Jay, blandly ignoring the fact that he wasn't of skin and bone. Boldly, he walked to within a few feet of the coffin, gestured toward the *Marathon*, beckoned and walked away.

The beckon is unmistakable in any language, but I certainly didn't expect that grotesque thing to obey it. With his broad back turned to the coffin, Jay walked off, and the coffin came to life and followed him with the slow, meek pace of a dejected horse. And that was the only time I saw Spanner gape and drop his tool.

Meeting McNulty at the lock, Jay said, "See? It has crazy ethics. The thing believes it's my prisoner!" He led it inside, conducted it into the hold, parked it in a corner where it stood obediently, without protest. "Ten to one it'll become lifeless directly we get beyond the sphere of radiation from which it draws its vim. We'd better let Steve fiddle with him—maybe he'll be able to restore it with some gadget of his own."

"Humph!" said McNulty, staring owlishly at the coffin. He turned to Blaine. "Tell Steve to come down here."

This surrender of a tough specimen held our minds while we closed the locks and prepared to blow away. Apparently the things would battle in squads, but not as individuals. One could not look into that coffin's mind—if it had a mind other than its share of the communal consciousness—but we wondered whether, like the lobsters, it was now fated to meet death at the hands of its fellows if it ever returned. Their way of looking at things was crazy, and craziest of all was their intolerance toward initiative such as we possessed.

It wasn't long, though, before we learned that corporate mentalities have advantages as well as disadvantages. We blew free from the black and crimson ground, soared for the last time on this cockeyed world, burst through the clouds, and encountered four rocketships. They were jet-black vessels such as we'd seen before, and they were drumming along in perfect line.

There was no question of the leader seeing us and issuing orders to the others. They saw us together, acted together, moving in wonderful unison. It reminded me of a great scientific mystery—that of how flocks of birds frequently alter course, change formation, wheel, soar and turn simultaneously. These ships were like birds. They switched course like one, cut into our path in echelon formation, bathed us in the same useless rays that had failed to affect us before, but again got Steve Gregory mad. I'd never seen such excellent teamwork.

It did them no good. Had their rays functioned as they were expected to do we'd have been a

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smoking heap on the earth below. We dived through the aura, snaked upward unharmed. They followed, changing to line-abreast with mathematical precision, nosing upward at identical angles. It was as if one man was moving the four by remote control. Together they blew their auxiliaries, spurting in our trail and narrowing the margin between us.

"Pretty fast," commented Jay. "About as fast as us under normal drive. I'd like to have a look at their pilots!"

"Don't want to see 'em," grunted McNulty. "Had enough of 'em for one trip." He yelled into the engine-room phone, the *Marathon* heeled over, plunged, shot upward once more. Glassware broke in the galley and somebody offered loud and vulgar opinions. The pursuing quartet heeled, plunged and rose behind us in unison.

Rays reached out for us once more, flickered without avail, then four streaks of fire flashed past on our starboard side. They even missed by the same margin!

"That's enough to be going on with," declared McNulty. Still blowing outward, he gave the *Marathon* an S-turn and said, curtly, "Straps!"

He gave us bare time to get into harness before he threw her into Flettner drive. I couldn't see them because you can't use the ports while prostrate, but the quartet behind must have shrunk to vague dots in one heartbeat. At full pelt we went out of that solar system, skimming the water world of Vargas so fast that nobody saw it. That lump, and its amphibian inhabitants could wait until next trip.

All the way home the Martians kept to the starboard air lock enjoying the three-pounds pressure and their everlasting chess. Jay spent much of his time down in the hold with Steve, presumably nursing the captured coffin, but the Martians did chivvy him into having seventeen games, of which he won three. They gloated, publishing the figures all over the ship.

Wilson kept to his cabin and brooded. I wasn't foolish enough to ask him any questions or offer any comfort this time. The clumsy warriors of Mechanistria had converted his earliest plates to junk while cavorting around the ship, but his subsequent shots were large in number and beautiful in execution. He was determined to worry them safely home.

Two cruisers met us just outside Terrestrial atmosphere, escorted us down. The old, familiar browns, greens and blues of Earth looked the loveliest sight I'd ever seen, though the Martians still preferred pink. They were still arguing over a footing pawn when we landed with the whole world watching and listening over the international network.

McNulty made the speech demanded of him. "We have had a somewhat difficult time . . . unquestioning hostility that is much to be deplored . . . this uncomfortable episode." And so on and so on.

Flettner was stuck up in front, blushed like a kid at McNulty's frequent references to the ship in which, for once, he didn't resort to understatement.

Back of the crowd I spotted old Knud Johannsen, the robot master, struggling to get through and looking anxiously for Jay. Sometimes I wonder if I've got prevision for, although I didn't know what was coming, the sight of that white-haired old wizard wanting to meet his last and greatest creation made me think of a fond father seeking his son.

The rah-rahs ended, we unloaded. Cans of copery water, flasks of compressed air, hundreds of samples of earth and metal were lugged out. Finally, we produced the busted automatons. The government experts rushed off with them as if they were bodyguarding the jewels of Asia. Wilson went even faster, bearing his plates and several cans of film.

Old Knud got through just then. He said to me, "Hello, sergeant—where's Jay?" He had no hat, and his silvery locks gleamed brightly in the sun.

Jay came into the lock at that moment. His gleaming eyes found the white-haired figure waiting for him. You know, robots can't make cracks, they just can't—and Jay had never made one in his life, not a recognizable one, anyway. But this time he made the best one I've ever heard, and it brought a lump to my sentimental gullet.

Gently taking Knud's hand in his huge metal paw, he said, "Hello—dad!" I couldn't see Knud's fond face, but I heard Jay add, "I've brought you an interesting souvenir."

He gestured into the lock. Came a steady clanking and a whiff of warm oil. The captive coffin emerged. Its curl was coiled up and attached by a wire to a black box on its back. Steve Gregory walked behind it, his eyebrows lopsided with self-gratification.

Arm in arm, Jay and Knud went down the gangway, the alien automaton following carefully behind, Steve trailing in the rear. I lost sight of the group when two special-delivery guys started to lug up the gangway an enormous vase of horrible shape and revolting colors.

Reaching the top, one of them produced a paper, gazed at it with distaste, and said, "This gobboon's for an octopussy named Kli Morg."

"I'll go tell him," I answered. "Take it down—the skipper won't have it aboard."

They broke it on the way down.

THE END.



# MILITARY EXPLOSIVES

By Malcolm Jameson

● **Military men want much more of an explosive than power alone. They need something that will blast suddenly and tremendously, but which can be burned, hammered, shot into and dropped without danger.**

About a year ago the nation was treated to some faintly hilarious press accounts of a certain demonstration held at Aberdeen Proving Ground. It appeared that an inventor had offered the army a new superexplosive that was claimed to exceed in violence anything now in use. The army looked at it and said no. The disgruntled inventor wangled political support; after some publicity, Congress took a hand in the matter. The "Colonel Blimps" must be exposed. A new demonstration was arranged.

It was quite a silly and fantastic affair, if the newspapers are to be believed. There was the inventor and the bomb, ordnance experts, and a flock of goats. The goats were tethered about the place to demonstrate the deadliness of the bomb's concussion. There were doctors with stethoscopes to testify to the degree of deadness of the goats. There was a committee from Congress, reporters, cameramen. It was a beautiful set-up for publicity, no matter how the thing went. A strange procedure, you may think, when it is considered that had the bomb been a success, it would have been the new and secret weapon that every rumor monger whispers of and every wishful thinker devoutly believes is up somebody's sleeve.

Yet the procedure is not utterly incomprehensible to those in the know. The army knew that the bomb offered was neither new nor suitable for military work. It was one of those perennial inventions that crop up every few years to plague the officers of the ordnance bureaus. If the sponsor of it appeared to have a flair for publicity and did not mind his invention being shown up, there was no reason why the army should object. There was certainly no need for secrecy. The particular type of bomb under test had been extensively used in the past half century as a blasting agent in mines—chiefly in Germany.

The bomb was duly prepared and placed. The goats grazed contentedly on; observers stuck cotton in their ears and waited. Unfortunately there

were last-minute delays, a little time elapsed before the firing key was pressed. Did some Machiavellian ordnance officer plan it that way? Ha! How should I know—I can be guided only by my hunch. But the accounts tell that when the bomb was detonated it was with an only fairly resounding bang. No goat died. No goat so much as fainted. The demonstration was a flop.

Now the defect of that bomb was not that it did not have power. It did. At the moment of its preparation it was stronger than forty-percent dynamite. But it was a mixture of liquid air and some combustible such as carbon black. If liquid air did not have such a rapid evaporation rate, such a bomb would be very useful. Unhappily, when the liquid air is gone, all that is left is a container of soot. An aviator starting out with a load of such bombs would be in a position much like that of a man going into a knife fight in the Black Hole of Calcutta armed with a dagger of ice.

This rather absurd episode affords a splendid example of what the army and navy do not want. They crave above all—first, last and all the time—stability. Detonation rates, shattering power, disruptive effects—all these are sought-for qualities. Cheapness and availability in quantity are also highly desirable. But all these together will not sell a military explosive unless it is stable. It must stand handling, long periods of storage, adverse climates. It must not deteriorate chemically or be too sensitive to heat, friction or percussion. It should burn rather than detonate if exposed to flame. The military man has to handle the stuff, travel with it, and live with it. He wants power—as terrific as possible—but he wants it under control.

To make the point clearer, perhaps it would not be amiss to list a few of the better-known explosives and compare their advantages and disadvantages. TNT (trinitrotoluol), to name the favorite, is probably the best all-round military explosive known today. It has many clamorous rivals, but none that possesses so many virtues. In cast form

it can be kept in storage indefinitely. It can be dropped, banged about and kicked around and still not detonate. Only the wallop given by a fulminate of mercury fuse is likely to excite it to action. Unless it possesses impurities such as trinitrobenzoic acid or boosters such as certain chlorates, tetryl, and the like, it will burn briskly but without explosion if set on fire. Yet when it does detonate, it does so at the rate of from five to eight thousand meters per second. It may not be the perfect explosive, but it will serve until the perfect one is found.

If TNT is granulated, it is much more sensitive and can be used as a detonator itself. It admits of mixture with other powders to achieve certain special aims. Mixed with ammonium nitrate it becomes amatol—commonly used in aerial bombs. Add powdered aluminum to amatol and you have ammonal, also used for aerial bombs. It gives a hot explosion and leads to fires. TNT is a versatile and dependable explosive.

Its sister, TNA (tetranitroaniline), is considerably more powerful, possessing close to half again its detonation rate. But it is expensive and it is also far too sensitive for ordinary use. It cannot be used in shells, for the shock of gunfire sets it off. For the same reason it is unsuitable for aerial time bombs. It is too bad, from the military man's point of view, that the most powerful of all solid explosives is so temperamental, but such are the sad facts. No doubt a clever chemist could find ways to tone it down, but the probabilities are that what he would gain in stability would have to be paid for by loss of force.

A far different explosive is "Explosive D," which is the service name for ammonium picrate. It not only resists the shock of gunfire, but the concussion of impact on heavy armor plate at the other end of the trajectory. (And it may be remarked that a sixteen-hundred-pound, hard-steel missile traveling at even its residual speed of fifteen hundred feet or so per second makes quite a smash when it slams into twelve-inch armor.) Since Explosive D will wait for the action of its fuse after it is well into the bowels of the target ship, it is much used for armor-piercing shells. In this respect it is superior to TNT itself. It may also be used in combination with gas.

Although a picrate, Explosive D differs from some other members of its family. During the first World War, picric acid came into use. Many thought it a comer in the field of high explosives. But before the war ended most of the warring nations had dropped it in disgust. It was discovered that it had the unlovable trait of generating ultrasensitive picrates when in contact with metals. Unexpected spontaneous explosions of ammunition dumps are highly undesirable from the military point of view. Thousands of tons of picric

acid were dumped into the sea after the war was over.

A similar substance—guncotton—though having a better record, has gradually come into disuse. Its weakness is that slight impurities, particularly certain sulphates, make it too unstable and dangerous to have around. TNT has replaced it in torpedo heads, where it had its commonest use.

There are many other high explosives. Tetryl has been mentioned (trinitrophenol methylnitramine), but it is too tender to use except as a booster mixed with inferior explosives. Others of the sort are: trinitroxylene, trinitroanisole, trinitronaphthalene, Tetranitronaphthalene, Hexanitrodiphenylmethane, trimethylenetrinitramine—and the jaw-breakingest set of all, the trio Pentaerythritetetranitrate, pentaerythrite or nitrate. The oldest of the modern high explosives is nitroglycerin, which is a very powerful explosive indeed. But it is far too touchy for anything but very special use. It is oftenest encountered in diluted form as dynamite, though it is employed as well to pep up the smokeless powders.

The old black powders must not be forgotten—those compounded of sodium nitrate or saltpeter. They were abandoned long ago as propellants except in sporting firearms, but still have important uses—to ignite smokeless powder, in pyrotechnics, and as detonation charges in a number of types of projectiles, notably shrapnel and common shell (that is, not armor-piercing; common shell is made to much less rigorous specifications than AP, but is good enough for weak targets, as buildings, cargo ships, and scattered troops in the field). There are also the nitro-starch powders, which have considerable shattering power and are cheap and plentiful. These are used mainly in hand grenades and trench mortars.

The fulminates are not regarded as explosives, but as substances to initiate explosions. The fulminate of mercury, and to some extent lead azide, is extensively used in primers and fuses. All the fulminates are extremely sensitive and extremely violent in action. Few are stable enough to be handled with any degree of safety; some are so touchy that the heat of the hand or a sneeze will touch them off. For that reason the fulminates of gold, silver, platinum, et cetera, are not encountered in arsenals.

All the substances mentioned so far are the explosives, as distinguished from the other class of powders, the propellants. They are so fast-burning as to be practically instantaneous. Their vastly destructive effect is due, not to their intrinsic energy, but to the abruptness with which it is delivered. Mercury fulminate gives its all so instantly that its detonation rate has never been successfully measured. The result is a moment of inconceivable violence. Objects in the vicinity,

due to their inertia, are shattered into fragments before they can start to move. For this reason high explosives are not used as propellants; they would burst the gun. A shove is wanted, not a disruptive blast. Hence the demand for slower-burning powders to eject the projectile from its firing tube.

Before going into what is required of these, it occurs to me that the two statements made above may not be entirely clear. To state that a pound of petroleum is more powerful than a pound of nitroglycerin because it contains more B. T. U.'s will seem illogical to many minds. Yet, if the energy of petroleum could be made as instantly deliverable as that of the nitroglycerin, the statement would be less questionable. Suppose the petroleum were all converted to gasoline; the gasoline evaporated and mixed in the proper proportion with air and then compressed to the original volume. If that mixture were inclosed in a stout container and ignited, we would have something that would rank right along with the best explosives. As to the effect of a small amount of energy suddenly applied being more disruptive than a greater amount more slowly applied, consider the analogy of a switch engine approaching a string of standing freight cars. If it noses up quietly and pushes, it will shortly have the cars rolling down the line at fifty miles an hour. But if it should come charging at them at fifty miles an hour, the result will not be the movement of the cars, but a splattering over the landscape of the fragments of locomotive and freight cars. That is why propellants are required to burn, not detonate.

Nowadays all propellants are nitrocellulose in one form or another. The sole important exception is cordite, which is a mixture of nitrocellulose and nitroglycerin. They are called smokeless powders. It is hard for the layman who judges by his unaided eyes and ears to regard them as slow-burning when he witnesses a big gun fired. The reaction seems instantaneous, but actually it is measurable. The present powders serve their purposes sufficiently well, but none is perfect.

As in the case of the high explosives, propellants represent a compromise. The faster the powder, the greater the velocity it will impart. But faster powders mean higher temperatures and pressures. High pressures and heat applied to metals cause them to flow, hence the faster the powder the worse the erosion rate in guns. The earlier cordites were very erosive. They were toned down later by eliminating much of their nitroglycerin content. Heat of explosion has another bad by-product—a vivid flame of discharge. In coal mines where there is danger of firedamp this is a serious detriment; in open quarries and excavations it is of no moment. In the case of military batteries, the bright flashes of discharge will reveal their

position invariably. The artillery designer must choose the happy mean. High pressure, hot powders give him superb muzzle velocities and flat trajectories, but they also cost him in shortening the life of his battery and betraying his position. The "best" propellant lies somewhere between the fastest and most powerful powders and such cool and invisible ejectors as springs and compressed air.\*

Powders have to be stable, too. They are not as sensitive to percussion as are the high explosives, but they are more susceptible to heat. In spite of meticulous chemical inspection throughout manufacture, an occasional index of powder—each batch of powder is assigned an identifying index number—will display a tendency to deteriorate. If such a powder is not watched constantly and the magazines containing it kept at moderate temperatures, it may in time blow up of its own accord. The destruction of the *Maine* could well have been from such a cause. Magazine explosions brought about in this way are very rare in modern times. The fact that they do not occur more often is due partly to the vigilance of the gunners in charge of them, and partly to the improved stability of the powders themselves.

In a battleship, for example, where there may be several hundred tons of powder on board, ranging from the fat macaroni-like "grains" of the sixteen-inch guns down to the fine spaghetti size of .30-caliber rifle ammunition, the most rigid inspection routine is followed. In the armory there is a long row of wide-mouthed glass bottles with ground-glass stoppers. Each contains a generous sample of one of the indexes of powder on board. Some powders are amber-colored, some dark-brown, some nearly black and some red. In every bottle there is a strip of paper on which a date has been scribbled. Some of the strips are violet in color, most are paler, and some are almost white. If the date on the violet paper is a late one, it means the paper has just been put in; if it is an old one, it means the powder is holding up well. The degree of paleness exhibited is an indication of the powder's tendency to deterioration.

Degenerating powder gives off nitric oxide fumes which have a bleaching effect on the test paper. It will require months for a healthy powder to whiten a test paper; a sick one will do it promptly. The ship's gunner checks these slips every day, as well as those in other samples located in the magazines themselves. The moment a powder shows signs of weakness, he at once submits it to sterner tests. He places a sample of it in an electric oven and turns on the heat. Any powder that is heated to much above one hundred degrees F. and kept at that

\*The U. S. S. *Vesuvius* was a great innovator in her day. She threw heavy charges of dynamite from a triple-gun arrangement fixed in her fore'st'le. The propellant was compressed air. She was the first and last of her type.

temperature will begin to break down. It is the rate of breaking down that counts. If the test sample starts to break down too fast under certain critical temperatures, it is promptly tossed overboard and another test started. If the findings are ominous enough, all the powder of that index will be at once dumped into tubs of water or its magazine flooded, depending upon the degree of the emergency. No one argues with sick powder. If prolonged investigations are in order, they can be held later.

Similar summary procedure is followed in the case of magazine fires, or when fires are raging in compartments adjacent to magazines. Every magazine admits of instant flooding and is equipped with thermostatic fire alarms. If there is a sudden and inexplicable rise of temperature, the flood valves are yanked open. It is better to spoil a lot of powder than to lose a ship.

Those whose experience with gunpowder began and ended with the handling of fireworks on juvenile Fourth of Julys would be astonished at the appearance of a scoopful of modern powder. Instead of being shiny black and flaky, the stuff looks more like hunks of horn or hard celluloid. If some of it were dumped on the sidewalk and lit with a match, it would not flare up in one bright blast, but would burn rapidly with a spewing flame after the manner of old camera film. But it would be the size and shape of the "grains" that would surprise him most.

A grain of powder for a major-caliber gun is about the size of a joint of the finger. It is cylindrical in shape and has a number of round holes running through it parallel to its axis. The layman may guess that the purpose of the perforations is to make the powder burn faster. In that he is right, but the story of the holes is more complicated. The holes are there to effect the *optimum* rate of burning.

Smokeless powder has the property of burning uniformly and in proportion to its surface. It can be seen at once that if a grain were spherical in form the maximum amount of gas developed would be at the moment of ignition. After that the amount of powder burned each millisecond would diminish rapidly. A simple perforated cylinder—such as a short length of raw macaroni—would be consumed at a more uniform rate. Its cross section would show an inner and an outer circle. As the grain burns, the outer surface contracts, the inner expands, until the powder is consumed and the two coalesce. A minor mathematical complication is present, too. It burns from both ends, also. By introducing several parallel holes and by varying their diameters, a great variety of acceleration rates may be predetermined.

If that were all there was to powder design, it

would be fairly simple. But the free-burning rate of powder is also tremendously accelerated by putting it under pressure. Powder burning in a tightly inclosed place, such as the ignition chamber of a gun, will build up pressures until in a moment it is burning at almost detonation speeds. Unless the pressure is vented—as by the moving out of the bore of the projectile—the gun will be ruptured. Until that happens the curve of pressure and rate of burning mount rapidly, each accelerating the other, but the moment the shell's inertia is overcome, both curves turn sharply downward. Some of the powder actually goes out, strange as it may seem. It is not uncommon to sweep up unburned powder fragments from beneath the muzzles of great guns. These are tiny spicules of triangular cross section and are that part of the grain left when all the holes have burned to the point where they interlace. These remnants are blown out in the wake of the shell, but why they cease burning is a mystery.

Since all this takes place in the space of about one-hundredth of a second and develops pressures of the order of tens of tons to the square inch, it is readily seen that the design of powder is not a thing to be undertaken lightly. Any slipsticker wanting to take on a problem worthy of his talents might try to find the answers to these questions: How many, how arranged, and of what diameters should the perforations in heavy-caliber gunpowder be? The interplay of the three variables—area of powder exposed, pressure and temperature—presents one mathematical tangle, but the real fun begins when the shell begins to move and the volume of the inclosed space to increase. When friction and the inertia of the shell as to both translation and rotation are considered, the fact that the ultimate strength of the gun imposes limits on the pressures and temperatures permitted, it is clear that a mere knowledge of chemistry is not enough for the development of the ideal powder.

Leaving out of account the illuminants—star shell, flares, rockets and other pyrotechnical specialties which employ the powders commonly used in fireworks and are relatively minor accessories to warfare—the remaining important explosive uses are to be found in primers and fuses.

The primer of today is built along identical lines with its hoary ancestor—the hammer-flint-spark-tinder-powder train sequence. The combination primer is a dual affair; it may be fired by an electric current or by percussion. The one sequence is spark powder, the other is hammer-fulminate powder. Primers resemble blank rifle cartridges and are inserted in a special lock in the breech block of big guns. When fired, they spew a jet of flame through a fine vent to ignite the rearmost

powder bag. (Smokeless powder is packed in silk bags and may not be immediately ignited by the primer blast; hence the rear end of each bag has a charge of black powder sewed on to it. This is readily ignitable and adds a bigger flare to the stimulus of the primer flame; as each bag catches fire, it ignites the bag ahead of it. The black-powder end of the bag is dyed a bright red to distinguish it.)

Primers, though small, are of utmost importance. They are the means by which the propellant charge is ignited and if one should fail it means that that gun will not fire as intended. If the fault lies in the firing circuit, they can still be fired by percussion, but the perfect synchronism of electric firing is not attainable that way. Moreover, electric currents facilitate distant control, since percussion can only be applied at the gun. It is true that distant control is still possible by means of visual or sound signals, but the variation in perceptive and motor responses of a dozen separate gunners is sure to give a ragged response. When guns are mounted on rolling platforms, such as ships, these small time-lags give rise to serious errors.

There are many links in the chain of events between the willing to fire and the arrival of the projectile at its target. The failure of any causes delay or worse. The most exasperating of all delays is the hang-fire. Hang-fires occur when the primer fires, but the charge does not. Sometimes they are caused by the failure of the powder-man to put the last bag in right end first. In that case the primer may not ignite the powder, though it may start the silk covering to smoldering. There is no way to know except to open the breach. But that would be the height of recklessness; a breath of air might fan the whole charge into a flareback and wipe out everybody in the vicinity. The only recourse is to keep firing primers in the hope that sooner or later the charge will take fire. A gun having a hang-fire may be expected to go off at any moment; it may wait for many minutes. In the meantime it is out of action.

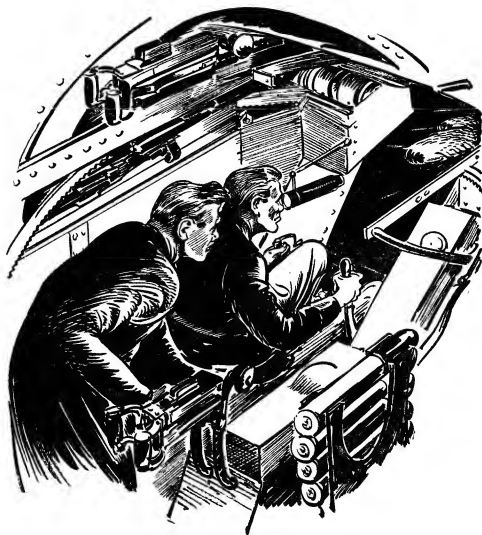
Primers fire the propellant, the propellant ejects the shell. At that point, control is taken over by the fuse. There are many types of fuses and the details of most of the current ones are kept a closely guarded secret, but the principles governing general design are internationally known. Percussion fuses employ a plunger—detained by a spring until impact—which strikes a pellet of fulminate of mercury which in turn ignites the detonating charge. Time fuses are trains of very slow-burning powder which delay the final detonation according to their length. The type used in shrapnel and illuminating shells begin to burn the moment they are fired, the action being started

by the blast of the gun; the explosion occurs so many seconds later, usually in midair. The type used in armor-piercing shells do not begin to function until impact with the target, when a percussion fuse sets off the delayed action fuse, which in turn a fraction of a second later ignites a more powerful detonator charge and the shell explodes.

Percussion fuses have to be protected from heavy jars, time fuses from fire. If it were not for the safety devices in use, handling heavy projectiles would be a distinctly hazardous affair. Slings do break, lines part, and shells have been known to slip out of their tongs. But it is usually safe—though not recommended—to drop a major-caliber shell a number of feet. Nothing is likely to happen, though if the fall is great—twenty feet or more—it is the practice to return it to the arsenal or ammunition depot for a check-up on its fuse. The shell has to go back there, for it is forbidden for untrained personnel to tinker with fuses. Even experts risk their hands and eyes in handling them.

The manner in which this immunity to unplanned percussions on mechanisms designed to be actuated by percussion is most ingenious. To start the sequence of ignition, the plunger element has to strike the fulminate element and it is held back by a spring strong enough to resist mild shocks. However, a long fall or an adjacent explosion is more than a mild shock, yet the fuse does not begin its action. It is because the plunger is also restrained by a clutch which will not let go unless strong centrifugal force is applied; it operates on the same principle as the old-fashioned governor on steam engines. When the shell is actually fired from a rifled gun—and not until then—the fingers of the clutch spread and let go. The fuse is then said to be "armed." So long as the shell is spinning at a good rate, the plunger is free to leap forward at any impact. It is only while in flight that an AP shell is really dangerous.

Torpedoes, depth charges and mines, bombs, grenades and the rest, cannot be gone into in the space of this article. They differ mainly from gun projectiles in the matter of their casing and their propulsion. The explosives employed are the same and the fuses follow the same principles. Gas shells and incendiaries are a specialty and deserve separate treatment. But enough has been said to demonstrate, I hope, that the field of explosives is not a promising one for the free-lance inventor. We must not look for startling and revolutionary inventions soon—those are more often the result of slow growth and the pooling of many intellects. Men who have been engaged for years in research and experimentation will undoubtedly come forward with improvements and refinements. So long as that keeps happening we should be content.



# THE INVADERS

By L. Ron Hubbard

● The captain was proud of his dangerous post. He resented the technician. And his ego was smashed when he learned where his dangerous post was.

Illustrated by Kolliker

The landing prison ship hovered a space above the field as though arrested by the titanic battle in progress below, but in reality only waiting for the assembly of a securing crew.

The Crystal Mines, beyond the mystery of the Black Nebula and in a world unlike anything anywhere in space outside, rippled in the waves of heat and shuddered under the rapid impact of fast-firing arc cannon. A desolate and grim out-

post, the last despair of convicts for seventy-five years, the latest hope of a fuel-starved empire of space, racked continually by attack.

The Crystal Mines, where disgraced officers came to battle through their last days against forces which had as yet defied both analysis and weapon. Heartbreak and misery and war beneath a roof of steel and upon strangely quivering ground, amid vapors and gasses which put commas and

then periods to the lives of the luckless criminals sent here as a punishment transcending in violence even slow execution.

Gedso Ion Brown stood at the port in awed silence, caught by the unleashed fury in the scene below and forgetting even the danger and mystery of their course into this place. For here below had come to being things more strange than any described in the folklore of any planet in a setting which he realized no man could adequately describe.

Below were metal blocks, the mine barracks and offices, sufficient to house half a million men. They crept up the side of a concave cliff like a stairway until they nearly touched the embedded edge of the mine roof. Curving down into the white stones of the valley was a spun silica wall a hundred meters high, studded at thirty-pace intervals by cannon turrets. The mine, the roof, the wall, all were contained in an immense cavern which was reached through a hundred-and-eighty-kilometer tunnel seven kilometers in diameter. This huge inner chamber was perhaps seventy-five kilometers wide and two hundred long and had its own ceiling fourteen kilometers above the uneven floor.

The light had no apparent source, seeming to exude from cliffs and ceiling and ground, possibly from the perfectly formed, sharp boulders, the size of ships, strewn everywhere, lodged everywhere, even hanging from the ceiling. These were a translucent white and constituted the product of the mine.

Up and down the wall went the lashing trajectories of the arc cannon, raking over the scorched and smoking ground, reaching in hysterical fury at the lumbering attackers.

Gedso Ion Brown put a pocket glass to his eye and looked wonderingly at the scene. He had heard here and there through space that such things had existed. He had reserved judgment for one could never tell what tale might next crawl through the vast spaces of the Empire. But the descriptions he had heard, probably because no man ever came back from the Crystal Mines unless he was a high officer, had been gross underestimates.

Gedso Ion Brown closed his pocket glass and put it into his shabby tunic. He was not of delicate constitution and he had been near too many battles to become shaky about anything. Further, nervousness was not part of his temperament. But he did not want to look at those things.

The spaceship was settling down to the charred landing field with its miserable cargo and Gedso Ion Brown turned back to his pinched cabin, one of the only two which had no leg irons included, to pack his slender belongings. A little later he shuffled down a gangway and put his trunk on the

ground and looked about for someone to tell him where his quarters were. But there was no one interested in him and so he stood with his baggy uniform blowing about his ungainly body, feeling unwelcome and forlorn.

A mass gangway to his right, like a leg of a rusty beetle, was crowded with the sullen freight brought here each trip. Convicts, emaciated and ragged and chafed by irons, were being herded into trucks by surly and ruthless guards. A regiment of criminal soldiers, branded by their black collars and lack of hand weapons, were forming under the ship's belly.

Gedso wondered if the commandant knew of his coming and looked nearsightedly toward the far-away P. C. where floated the tricolored banner of the Empire. Guards and hard-stamped officers passed him by without speaking. Gedso felt even more alone and unwelcome.

He was not a prepossessing figure, Gedso Ion Brown. He was a full two meters tall and he weighed two and one-half times as much as another the same size for he had been born on Centaur One of Vega to pioneer Earth parents and Vega's Centaur One has a gravity two and one-half times that of Earth. A shuffling gait, a forward cant to his disproportioned head and thick, round shoulders minimized his appearance.

Life to him had always been a travail. At his Earth engineering school he had been dubbed a "Provincial lout" and he had earned it for he crushed whatever chair he sat upon and in an unthinking moment might pull a door off its hinges if the catch held a second too long—and then stand looking stupidly and embarrassedly at the thing he held by the knob. Awkward and ungainly and shy, Gedso Ion Brown had never made much way in the Extra-Territorial Scientific corps, getting his promotion by number and so progressing alone and ignored in a service vast enough to swallow even his unhandsome bulk.

People generally thought him stupid, basing their conclusions upon his social disgraces, but this was not fair. In his line Gedso was alert enough and it is doubtful if more than two or three men knew of that trick of his of glancing at a page and mentally photographing the whole of it. In such a way Gedso studied. In such a way did he hide his only shining light. He had two vices—apples and puzzles—and the only baggage he had placed in the freight room contained nothing else.

The arc cannon crackled with renewed ferocity and he looked away from the things he could see lumbering beyond the far wall. Convinced at last that his arrival was going unremarked, he tucked the heavy trunk under his arm and shuffled toward the P. C. Jostled by guards hurrying in and out of the place, he put down his burden and sat on it.

A trusty orderly jabbed his back with a juice wand. "You're blocking the way."

Gedso looked at the narrow, evil face and shifted his trunk farther off the walk and sat down again with an embarrassed apology.

"What do you want?" said the trusty. "You can't hang around here all day."

"I'd like to see the commanding officer," said Gedso.

"He's busy."

"I'll wait," said Gedso uncomfortably. He took an apple out of his pocket and shined it on his tunic sleeve.

The breeze which blew up from the wall two kilometers away was acrid with brimstone and hot with the stench of death. Officers and runners came and went, a two-way stream of weary, sick men. Gedso noticed, after a while, that they were all of one expression on leaving the squat building no matter their expressions when they arrived. When they came out they looked scared and whipped, and Gedso began to form an idea of the character of the commander within.

"You still around here?" said the orderly. "You can't throw garbage in this yard!"

Gedso picked up the apple core he had dropped and put its dusty brownness in his pocket. Time slogged slowly onward. The crackling along the wall eased and the shapes were no longer visible beyond. Gedso tugged at the orderly's sleeve, carefully lest he break the man's arm.

"Would you please tell the commander that I would like to see him?"

"What's your name? What do you want to see him about?"

"My name is Brown. Gedso Ion Brown. I'm a technician in the E-T. S. I've been ordered here."

The orderly looked startled and then weak. He nearly dropped his juice wand as he whipped to attention. "I . . . I am s-s-s-sorry, sir. The c-c-commander will be informed immediately, s-s-s-sir." He dived into the post and came skidding back to attention. "The commander will see you immediately, sir. I . . . I did not have any idea you were a technician, sir. I did not see your insignia, sir."

Gedso said mildly, "Will you watch my trunk?" and went on inside.

The secretary, a convict soldier with the chevrons of master sergeant on his blouse, opened the door into an inner room. Gedson ambled through.

Jules Drummond, captain general of the Administrative Department's Extra-Territorial Command Corps, looked sourly up from the manifests of the newly arrived space vessel. He was a thin, dark gentleman, very tall and very military. His face had never known a smile and his eyes nothing but disdain. He was half ill with the vapors of

this gigantic pest hole and, at intervals, mechanically dosed himself from a rack of bottles in the arm of his chair. There was a look of hawk cruelty about him, a look so common to E-T. C. C. commanders and intensified in General Drummond.

He looked for a full minute at Gedso and then said, "So you are a technician, are you?" With intentional rudeness he looked back at the manifest and left Gedso standing there. After a while he snapped, "Sit down."

Gedso squirmed in discomfort and looked at the frail chairs. He pretended to ease into one, but held himself up from it.

"Where are your orders?" said Drummond.

Gedso fumbled through the baggy pockets of his tunic, found three apples and a core, but, much to his embarrassment, no orders. Faltering he said, "I guess—I must have packed them."

"Humph!" said Drummond. "The next time you report to me at least wear insignia."

"I'll get the orders," said Gedso. He went out and got them from his trunk and brought them back.

Drummond again ordered him to sit down. It did not occur to Gedso to resent such treatment. He was only nominally under orders from General Drummond, for the Scienticorps was too important and too powerful to be ordered about by E-T. C. C. officers.

Acidly, Drummond threw the orders on the desk before him. "Two months ago I phoned for a technician. The fools! They know what the catalyzer from these mines is worth. They know how important it is that we work unhampered. And if they don't know that we expend more men in fighting than we do in mining, they are stupid! Political fools, bungling the affairs of the Empire! They send me prisoners on their last leg with disease instead of workmen and artisans! They send me drunkards and worse for officers. By the look of it they want us to be driven from here, want the mines to close! I beg for a technician. A real technician to do something about this continual warfare. I tell them that day by day it grows worse and that it is only a question of time before all of us will be devoured alive!"

"I am a technician, sir," ventured Gedso timidly. "I'd like to do what I can to help."

Drummond seared him with a glare which took in the soiled and wrinkled slacks, the oversized tunic with its too-short sleeves, the eyes peering nearsightedly from behind thick spectacles and the unkempt mass of tow hair which further impeded vision.

"The final decadence of Empire," said Drummond nastily.

Gedso seemed to miss the insult. "If you could get somebody to tell me what is wrong—"

"What would you do about it?" said Drummond. "I'll send an engineer. Now get out of here!"



Gedso slipped as he rose from the chair and sat back with his full weight. It splintered to atoms under him and the whole post shook. Scarlet and confused, Gedso backed up through the door.

From the office soared Drummond's voice as the general looked tragically up toward an unheeding deity. "The Crystal Mines, the most vital and important post in all space, the most valuable command any man can be given! And they send me fools, fools, fools!" He threw himself dramatically upon his desk with a despairing sob.

The orderly was a mental chameleon. When he dropped Gedso out of the passenger truck before the isolated little hut reserved for Extra-Territorial Scienticorps men in case they might come to inspect, the orderly did not offer to help Gedso with his trunk or even go so far as to hope that Gedso was comfortable. The orderly who, after the fashion of orderlies, had had an ear glued to the wall of Drummond's office, hurried away to spread, after the fashion of orderlies, his commander's opinion of the latest addition to the staff of the Crystal Mines.

That this was true was indicated by the attitude of the third-rank combat engineer who slouched up to the hut two hours later and found Gedso lying on the hard bunk eating an apple.

All his life, Blufore, the third-rank engineer, had heard tales of the technicians of the E-T. S., but only twice before today had he seen a technician first class in the flesh and not until today had he spoken to one of the "miracle men." Glorified in song and story, in spacecast and rumor, E-T. S. technicians, "trouble shooters of our far-flung lifelines," "magicians in khaki," "test-tube godlings," seemed to have a right to awe. There were twenty-seven thousand of them spread out amid a hundred and eighty-five trillion beings, things and men who held down the habitable spots of space, and a technician first class was, reputedly, never sent to duty unless everything was gone awry. Blufore had come ready to discard the flying rumors and bad opinions of this technician, for he knew that the technician's presence was the Grand Council's most scathing criticism of a military administrator.

Blufore saw the ungainly hulk of Gedso Ion Brown sprawled upon the bed. Blufore saw the apple and a core upon the floor. Blufore saw no test tubes or servant monsters. And when Blufore heard the mild, almost stuttering voice bid him, "Come in," Blufore reacted as would any man experiencing the downfall of a god. He was ready to kick the chunks around.

Gedso looked nearsightedly at Blufore as the man sat down. Gedso did not like the swaggering, boasting expression on Blufore's face or the precision of Blufore's fancifully cut uniform. Blufore made him most uneasy.

"I came to give you the data on this mess," said Blufore. "But there's nothing anybody can do which hasn't already been done. I know because I've been here for eighteen months. I know because as a combat engineer I've tried every form of repelling force known without result on the 'things.' Now what do you want to know?"

Gedso was not offended. He swung down his feet and cupped his chin and looked at Blufore. "Just what are these 'things'?"

"Monsters, maybe. Living tanks. Some of them weigh a hundred and fifty tons, some three hundred. Some have a front that is all bone mouth. Some have eighty to a hundred and twenty legs. Some are transparent. Some are armor-plated. There have been as many as five thousand dead before the wall, making a wall of their own, and the others have kept right on coming. I suppose half a million of them have been killed by arc cannon in the past five or six years. Sometimes the push is so bad from the back that the dead are shoved like a shield right up to and through the wall and the things behind start grabbing soldiers. We lose about two hundred men a week."

"How long has this present battle lasted?" said Gedso.

"Seventy-five years. Since the day the Terrestrial Exploration Command moved in here and found the crystals. First we fought them with ranked space tanks. Then with a force field. Then with fire guns. And now with arc cannon. They can be killed, yes. But that never stops them. Their attacks are in greater or lesser ferocity, but are spaced evenly over a period of time. Intense for an Earth week. Slack for an Earth week. Intense for an Earth week. Over and over. This is a slack period. They have broken through the wall just once, yesterday. They've been at this attack for seventy-five years."

"You don't know what they are, then?"

"Nobody knows and nobody ever will," said Blufore.

"Have to ask," apologized Gedso. "Ask a question, get an answer. Have to ask. Is there anything else peculiar about this place?"

"Peculiar! You must have seen it from the outside. You come through a wall of ink a thousand light-years long and high and three light-years thick. And inside the Black Nebula there are no stars or space as we know it, but gigantic shapes, dark and vague. And the space has force in it which heats a ship scorching hot and knocks it around like a cork in a dynamo. And you come in here through a tunnel to get to a chamber which is light but has no sun, where the most valuable catalyst ever found lies all over and even sticks from the ceiling. Peculiar! The mystery,

of this continued, seventy-five-year attack is nothing compared to the bigger mystery."

Gedso said, "Are there any other tunnels leading out from this chamber?"

"I suppose there may be. It is too dangerous to scout. And there is no need to go beyond."

"I see," said Gedso.

"And within another month we will probably have to abandon this place," said Blufore, in a lower tone. "The wall out there was high enough once. Now it isn't. The arc cannon have less and less effect upon the 'things.' Each weapon has at first been adequate and then has become useless. And now there is no weapon to replace the arc cannon. We'll have to abandon the Crystal Mines and the Empire can go to hell for its catalysts. And, between us, I can't say as I particularly care."

"I see," said Gedso, blinking his eyes like a sleepy pelican grown elephant size.

"You can't do anything about it," said Blufore.

"Maybe not," said Gedso.

"That's all I can tell you," said Blufore.

"Thank you," said Gedso.

Blufore left without the courtesy of awaiting a dismissal.

Gedso put a couple of apples in his pocket and shuffled out into the gaseous light. He stood for a little while listening to the arc cannon crackle and blast and then moved slowly toward the wall, stepping off the road when cars and line trucks dashed by.

He climbed a stairway up to an observation post and hesitated near the top when he saw an army lieutenant and a signalman there.

"No visitors allowed," snapped the lieutenant.

"Excuse me," said Gedso and backed down.

He went to the outer wall and climbed to a command post there which he made certain was empty. He wiped his glasses and gazed through the dome out across the broken plain.

Somehow he could not get the "things" in focus at all and, for him, they moved as gigantic blurs, agleam with the savage light of exploding electricity from the arc cannon. The horde reached far, a moving, seemingly insensate sea, pushing forward into the glare of battle.

A convict private scuttled into the dome from the turret, beating out the flame which charred his tunic. He saw Gedso and started, but then saw no insignia and relaxed.

"Damn fuses. Six billion kilo-volts," volunteered the private, gazing ruefully at his burned hands. He was a snub-nosed little fellow, slight of build, hard-boiled in a go-to-hell sort of way. He fixed a curious eye on Gedso. "What are you doin' around here? You ain't a tourist, are you?"

"Well—" hesitated Gedso.

"Heard a party of tourists came here once.

Thought it'd be fun. Two died of shock and the rest took the same ship back. Friend of somebody?"

"No," said Gedso. "I guess not. You must have been around this place for a long while."

"Four solar years and a butt," he pointed with a grin at his black collar. "Stripe soldier ever since I put ten passengers and an afficer into Uranus on the Jupiter shuttle. They got wings. I got a dog collar. I gotta be gettin' back to the gun before some sergeant spots me and hands out some black-and-blue drill. There's worse things than fightin' them 'things.' You got a gun when you're up here."

"Don't you ever get—upset up here?"

"Upset? Hell, pal, I had to either get over that or go nutty. I'm so varnished with inhuman feelings that I take one look at them 'things' and give 'em the works." But there was sudden change of expression in his eyes which belied his bold words. "I gotta get back to that gun."

"Have you any ideas on how to stop them?" said Gedso.

"Me? Hell, if I had any ideas it would be on the subject of desertion or mayhem to noncoms. Look at them 'things', would you? By the bats of Belerion, I killed a hundred today if I killed one and there they are gone and live ones in their places."

"You mean they eat their own dead?"

"Naw. The dead ones sink into the ground in two or three hours and disappear. Look, I'll blast a couple."

The private went back into his turret and Gedso ambled along at his heels. Gedso made the small room somewhat crowded, but the private could have jumped through knotholes and so was not much inconvenienced.

The arc cannon's twin electrodes thrust outward, weighty because of the repelling magnet between which kicked the center of the arc half a kilometer in a broadening egg-shaped line. Stewie, or so read the letters on his back below the number, fitted a big fuse into the clips and sat down on the cannon ledge, hands grasping levers. His bright, brown eyes peered through the reducing glass which served as a sight and Gedso, behind him, found that he also could see through it.

The attack was developing out front as the things lumbered forward, breasting a force field and treading shakily upon the flaming ground. Turrets to the right and left were blasting away. Stewie put his weapon into operation by the flip of a switch.

An arc made a loop about a meter in diameter and then, as it heated up, began to leap outward like a stretched band. The noise grew and grew and the brilliance of the arc, though cut by the glare shield, became hurtful to the eyes.

The "things" had pushed in a salient before this turret, but now into either side of that one in advance the arc began to play. Seen in the reduction glass, its outlines were almost clear. A great blob. No legs. A mouth with horizontal bone lining which now ground together, opened and shut. The thing came on, flanked on either side by a different sort.

Gedso blinked when he saw that the arc, gauged around six billion kilo-volts and five thousand amperes, had no perceptible effect upon the gigantic target. As the things came on there were fourteen of them linked abreast by the arc. Force field. Flaming earth white tongued with heat. Six billion—

Gedso looked at Stewie and saw how white the little fellow was getting around the mouth. He was affected by more than what field came through the insulator panel which protected him from it.

"Stop," snarled Stewie. "Stop, you waddling blankety blank blanks! Take it you hell-gulping blobs of stink. Stop!"

On came the salient. With the casual precision of well-trained troops, things to the right and left fought forward to keep the flanks of the bulge covered. Arcs from turrets all up and down the line gave the sight a jumpy, yellow glare. Behind the salient an illimitable mass was gathering, ready to rush through any break.

There was no sound but the crackle of arcs and the hiss of the white-heated ground. Pushing over crystalline boulders the size of houses as a man might roll a pebble underfoot, the legions pressed forward.

Sweat was dripping from Stewie. His thumb was easing the range expertly. His trained body reacted in unison with the targets' every shift.

A quarter of a kilometer. Half of that. A hundred meters. Fifty meters. Ten meters. In the reduction sight the heads of the foremost filled the field. Eyeless, expressionless. Gaping caverns of mouths.

Stewie was almost depressed to the limit of the weapon. He was swearing in high-pitched gibberish at the wall men in his immediate vicinity, though they could not, of course, hear him.

The bulge was against the wall. The wall trembled. Fulminating acid was suddenly dumped from huge caldrons on either side of each turret. The torrents splashed devastatingly upon the tanks.

The wall began to shake and then teeter backward.

A scale filled the whole field of the reduction sight. With a crunch the top of the turret sagged, showering Gedso and the gunner with shivered splinters of transparent, shell-proof, heat-proof, failure-proof battleglass.

Stewie's ledge swept down and the electrodes of AST—5a

the cannon swooped up with savage fury. A huge spot on a scale was visible, taking the full impact of the concentrated fire.

Gedso let drive with a blasting wand. This and the arc had the sudden effect of lashing the scale spot into flame. It moved on. The flame spread out. It became roasting hot in the turret and Stewie ducked under a floorplate, tugging anxiously at Gedso's shoelace to get him down. The floorplate clanked into space and Gedso flipped on a fingernail torch. Stewie was trying to grin, but he was racked by shudders. There were flecks of lather in the corners of his mouth and a not-quite-sane light in his eyes.

The wall began to sway anew and then, with earthquake abruptness, shook like the dice in a cup about the dog cell. Gedso put a hand out and pinned Stewie to the far wall to ease the strain of the shock. There was a final crash and then quiet descended save for the far-off *snap-snap-snap* of mobile guns.

"They're through," said Stewie, steadying his voice with an effort. "They're between us and the barracks; they're being fought by tanks and pill-boxes." A shudder took hold of him and he fought it off. "That's what's been happening more and more often for two months. They care less and less about arc cannon. First time, four years ago, arc cannon stopped 'em like mowing down weenies at a picnic. Now we'll get a new weapon, maybe, and it will last a couple of years. All we do is toughen them up! One weapon. The next. And what the hell's the use of it? They tell me there's nothing that can do more damage than a cannon like you saw up there."

There was a lurch and then another and Stewie whispered, dead-eyed, "The 'things' heard us and they're looking for us. *Sssshh!*"

They sat in silence, shaken now and then, hearing stones and spun silica crush under weight.

Gedso took out the two apples and gave one to Stewie who repressed a nervous giggle and bit avidly into it. The gesture had not been intended as a demonstration of aplomb, but Stewie took it that way and appreciated it.

Ninety-three minutes later, by Gedso's watch, all movement in the rubbish ceased. The *snap-snap-snap* dwindled away.

There was silence.

"Either there isn't any mine," said Stewie, "or our birds got rid of them."

They waited a little time in order to be sure that the "things" no longer snuffled about the wreck of the wall and then Gedso went to work. Stewie was stricken with awed respect at the sight of the seemingly commonplace Gedso pushing out of the rubble like a superdrive tank, so much amazed, in fact, that he nearly forgot to follow. When Gedso was on top of the blasted remains he made sure all was clear and then, reach-

ing down, snagged Stewie's collar and yanked him forth like a caught minnow.

The break had not been without damage to the inner defenses for two towers spread their disassembled parts upon the ground and a rampart was crushed like a slapped cardboard box. A thousand-yard section of the outer wall had been smashed and lay like an atomized dust pile.

A clearing crew, hauling a dead "thing" behind four huge tractors, stopped work to stare in surprise at the pair who had erupted from the debris.

Gedso and Stewie picked their way over the scored and littered ground, depressed by the fumes arising from the mountainous dead "things." A silica spinning sled almost knocked them down as it rushed to the repair of the defenses and as they leaped out of the way an officer spotted the convict uniform. Stewie was snatched up and cast into the arms of a straggler patrol which flashed away without any attention to Gedso's protest.

That evening—or at the beginning of the third period—Gedso sat at the table in his quarters eating his dinner out of a thermocan and gazing thoughtfully at the murky shadows in the far corner of the room. He was intent upon his problem to such an extent that he only occasionally remembered to take a bite.

New weapons. Year in and year gone combat engineers had invented new means of knocking down the menacing legions. And certainly, with the power available, there seemed no more lethal weapon than the arc cannon—for here it was evolved to a point over the horizon from weapons used in the remainder of space. The invention of another weapon, even if that could be accomplished would not prove wholly efficacious for it would only last two or three years and then yet another would have to be compounded.

His door was thrust inward and General Drummond stood there looking at him. Drummond's eyes were bloodshot and his mouth twitched at the right corner.

Gedso was confused by the unusualness of the visit and hastened to leap up—spilling the thermocan's gravy across the bare board.

Drummond flung himself into a chair. "I'm worn out. Worn out! The responsibility, the greatness of the command, the rotten character of aid—" He looked fixedly at Gedso. "When will your new weapon be ready?"

"I . . . I don't think I am going to build one," faltered Gedso. "There is nothing better than an arc cannon."

Drummond sagged. "Served by fools. Strangled in red tape. The most valuable command in the Empire left with no attention to its need. I'm hardly used. Hardly." He straightened up and looked at Gedso, addressing him directly.

"You were sent here to invent a new weapon," said Drummond harshly. "You are going to invent it. I know that I cannot command an E-T. S. officer unless in a situation where my command itself is threatened with extinction. The command is threatened. I, General Drummond, have the power to demand of you a means of stopping the attackers. If I do not receive one in a very few days, I shall be forced to accomplish your recall. I have influence enough to do that."

"My orders," said Gedso, "read that I must investigate the threat to the area here and achieve a means of lessening or removing that threat if it exists." He recoiled from contradicting Drummond, a general, for any human contact made his shyness acute. But he knew he was well within his own rights. "I do not think a new weapon can be evolved and I do not think its effectiveness would be final, no matter how good it might be. I must ask for means to inspect this entire area—"

"Bluford intimated," said Drummond, "that you did not intend to set to work immediately. That is why I came here. I also happen to know regulations. If I wish to effect your recall and replacement, I must give you notice of it in writing. Your interference today on the outer defenses caused a breach to be made in them. I have the full report from an officer and gunners in flanking turrets who saw you go there and saw the fire cease in the turret you approached. You interfered with a gunner on duty. Here are the signed affidavits. I did not intend to submit them if you had actually worked out a means of improving our defenses. My procedure is correct and not to be questioned. Here are your copies of my demand for a new technician. The originals will be facsimile transmitted within the hour."

Drummond rose and looked at Gedso. "You see, my powers are not small and my command far too important to be slighted by anyone, much less yourself." He threw the papers on the table, where the gravy immediately stained them, and started out.

"Wait," said Gedso, "tell me what happened to the gunner!"

"That is a military matter and is in no way within your province." Drummond again would have left, but an arm shot across the doorway—Gedso had moved with such swiftness that Drummond could not believe the heavy fellow had crossed the room.

"You mean you are going to punish him?"

Drummond replied, "It is to be regretted that we cannot punish all those who affect our operations in so summary a manner."

"You are going to execute him?"

"That is the penalty."

Gedso faltered, but only for a moment. "If . . . if you will drop that sentence, I will guarantee to bring peace to these mines in five days."

Drummond knew he had a winning card. "I can suspend the sentence until you do, if we must bargain for what is actually a duty. That is a very wild offer," he added, "in the light that peace has not been brought to this place in seventy-five years of constant endeavor by the greatest engineers of the Empire."

"Release him to me and I will do it in four days!"

"Wilder still. But—it is a bargain. If you fail, of course, the sentence goes back into effect. That, naturally, is understood. And now, if you will be so good as to step aside, I will relieve myself of your company."

Drummond left and Gedso wandered back to the table to stand there fingering the copies without being wholly aware of them. The folly of his statement was beginning to grow upon him and he could not clearly understand what strange emotional forces had so led him to stake his reputation. And then he remembered half-pint Stewie with the snub nose and the grin and sighed with relief. There was just a chance— Gedso dropped

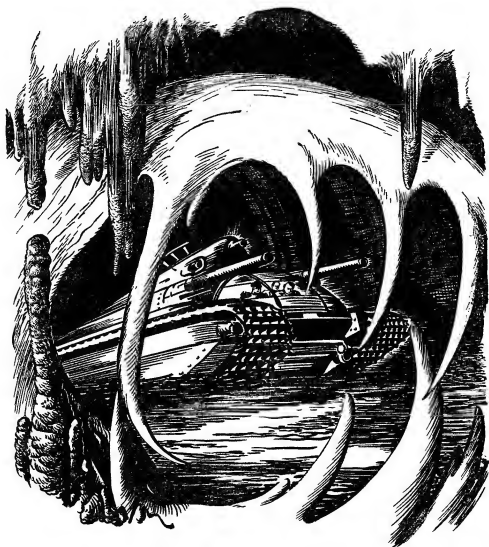
upon his knees beside his baggage and began to haul forth engineering treatises.

The scout ship vibrated nervously as her tubes warmed as though she shivered at the consideration of the cruise she was about to undertake or, again, in annoyance with the agitation and harshness in the voices of the group of men who stood at her side on the ground.

"It was my belief that you only intended an aerial examination of the mines," said Blufore haughtily.

Gedso's tone was patient. "The character of this area has never truly been determined. It will be necessary to go outside and perhaps even to the Black Nebula itself. Unless I am allowed to make the examination I cannot collect facts with which to work."

"I fail to see," said Blufore, "what an examination of 'outside' has to do with fashioning a weapon to stop these attacks. My orders are specific. I am to act for General Drummond and supervise the interests of his command. It is very



unusual to let anyone have a scout and it is unheard of to penetrate 'outside' with such a ship!"

"And yet," sighed Gedso, "I must go out there."

"You have already wasted a day," said Blufore.

"And now you waste another and perhaps a scout as well."

The pilot, a dark-visaged officer who seemed to be made of *roccill* from the way he smelled, reeled a trifle and said, "That finishes it. I can determine when and where I will take my ship and I'm not taking her 'outside' and I don't care if the E-T. S. complains until the end of space!" So saying, he marched off.

"And I," said Blufore, "do not consider it wise to expose a piece of government property to such danger and so refuse to accompany you, thus preventing our departure, for the orders are specific in that I am to accompany you."

"I am sorry you are afraid," said Gedso.

"Fear?" said Blufore, stung. "I have no knowledge of the meaning of fear, sir. But discretion in the expenditure of government property is the first function of a combat engineer—"

"Then you have to go with us or we cannot go," said Gedso.

"Just so," said Blufore haughtily.

A much overburdened little man came up and began to dump bits of equipment through the hatch. Stewie looked pale after his ordeal with the penalty bureau, but his eye was bright. Stewie had been bowed with awe at the intelligence that his companion in the battle had been a Scienticorps technician, but awe, with Stewie, was not of long duration.

"What happened to the pilot?" said Stewie from the top of the ship.

"He quite definitely refused to go," said Gedso.

"And what is wrong with this guy?" said Stewie, pointing at Blufore with a disrespectful finger.

"If he doesn't go with us, our permission is canceled," replied Gedso.

Stewie went on dumping equipment in the hatch while Blufore, ignoring a convict gunner as a self-respecting combat engineer should, went on with the finale of obstructing Gedso. There is a certain glory in being able to talk strongly and disrespectfully to one to whom one should salute with reverence.

Abruptly, Blufore's clear and melodious voice ceased and Blufore dropped heavily to the ground. The thermocan which Stewie had dropped on his head rolled a little way and then stopped.

Stewie glanced around to see if anyone had noticed and then said urgently to Gedso, "Hand him up. The orders don't say anything about what *condition* he has to be in to go, do they?"

Gedso hesitated for a moment. "But the pilot—"

"Even if I ain't touched one of these for years and years, I can still make 'em do tricks," said Stewie. "Hand him up!"

Gedso handed up Blufore and they dropped him into the hatch.

A few seconds later the scout ship was aloft.

When Blufore at last came around, several hours later, he received the vague impression that he was being shaken by demons and kicked by *Faj* men. But such was not the case. The scout cruiser was being battered about by a hurricane of bright-yellow wind and running from darkness into light with such rapidity that the change constituted an aching vibration.

Blufore, seeing a convict jacket on the man at the controls, thought himself the victim of an attempt to escape, particularly since he himself was strongly strapped into an observer's seat. Then he caught sight of the technician.

Braced by four lashed lines which ended in eye-bolts, Gedso was standing before the ports, busy with a big shiny box from which came a loud and continual sequence of clicks. Beyond Gedso, Blufore could see the towering vaguenesses of the "outside" and the aspect of this, combined with the space sickness caused by the violent and unsteady motion of the tiny craft, made Blufore very sorry for himself.

"Go back!" he whimpered. "Go back before we are torn apart!"

Stewie said, "Shall I hit him?"

Gedso was too intent on his work to answer.

Blufore subsided and resigned himself to an agonizing doom. He knew so well that two out of every three space freighters sent back from the Crystal Mines never arrived at all, were never heard from again, and it was thought that they vanished while traversing the Black Nebula. His only hope was that they would return to the mines in a short while. And then the ports went dark and stayed dark. They were within the Black Nebula. Blufore fainted, both from illness and terror.

He had no means of knowing how long they were inside the darkness for they were in the light when he came around. They could not have gone through for that would have taken many, many hours. Perhaps now they were going back to the mines. Perhaps even yet they might return alive from this. Then horror struck him down again. They swooped into a turn and the dread black mists shut off the light anew.

From a long way off Blufore heard the series of clicks and opened his eyes to the yellow hurricane once more.

"Want to go through again?" said Stewie to Gedso.

"One more time. I think we might possibly get some results if we keep it up long enough."

"You're the boss," said Stewie, swinging the cruiser back into the darkness.

Running the rim, stabbing into and out of the

Black Nebula! Like a couple of schoolboys amusing themselves playing with a high-tension wire. Blufore bethought himself of all those vanished ships and, with a groan, collapsed.

Gedso was giving Blufore a drink of something acid when that officer next knew anything. But Blufore was too spacesick to swallow. He looked with tortured mien upon the fiend he had begun to conceive in Gedso. It was dark outside, and the cabin lights gave the technician a terrifying bulk.

"Are we—still inside it?" gulped Blufore.

"No. We are trying to find the entrance to the mines and it is somewhat difficult to do in the darkness."

Blufore tried to peer through the black port, but could see nothing. Yet Stewie was flying at full speed and without a sign of caution.

"You'll be all right soon," said Gedso sympathetically.

Blufore moaned, "I'll never be—all right again. Never."

"I'll say you won't," growled Stewie, a shadowy gnome against the lighted panel. "If you yap-yap when we get home."

But a man of Blufore's disposition could never miss the opportunity of getting another in trouble.

Hours later, in his quarters, Gedso hunched over a Black Nebula pilot, entrenched by stacks of transmographs and log tables, eating obtrusively upon an apple. Stewie sat in the corner on his black, convict blankets, his eyes closed and his head thrown back, worn out, but not admitting anything of the kind. He would partially wake each time Gedso muttered into his study and then, hearing phrases meaningless to him, would relapse into his semislumber. Finally Stewie fell out full length and began to snore gently. When he awoke again he was completely refreshed—and Gedso, even more deeply entrenched in scratch paper and reference books and apple cores, was still working.

Stewie got up with the intention of finding some breakfast, a search in which he was most eager, for good food was not listed among the doubtful benefits of convict soldiers.

"Make mine milk," said Gedso and went right on working.

When Stewie had finished his repast, Gedso stood up and began to thrust notes into his pockets.

"You got an idea?" said Stewie.

"Perhaps," said Gedso. "But if we can get permission to go where we have to go, the recent excursion will be mild by comparison. Are you sure you wish to accompany me?"

"Don't gimme that," said Stewie, and he tagged

the towering Gedso out across the parade ground.

Drummond was at his desk, drinking thick, green *britt* and waiting for a target upon which he could vent his frustrations.

"No!" said Drummond. "I have already heard in full how you went about your last trip. This is all complete nonsense! You seem to have no realization that this is the most important command of the Empire and that its affairs must be handled in the most exemplary manner possible! You have abused one of my very best combat engineers and you have overreached the authority you were given."

"I accumulated certain data," said Gedso hesitantly. "Perhaps I may be able to do something if I am allowed to have a company of troops."

"You know as well as I that technicians have no power to command troops."

"But I want a company of engineers," said Gedso. "If they have to fight very much, it will be my fault. Just one company of armament engineers."

"If they are to construct a weapon of your planning, you may have them, but you cannot set foot outside the mines!"

"This area," said Gedso, "has never been examined properly. We have gone outside and now we must go deeper into the tunnels."

"Nonsense. You would be engulfed by the 'things' before you had reached a point thirty kilometers hence. This is folly and stupidity! We must have a weapon and you were given five days in which to make it. You have not so much as started and you have only two days left! I am no ordinary officer, Technician Brown. No ordinary officer would be given such an important command as this. I have influence and by the Seven Moons of Sirius' Bethel, I'll show you that you cannot snap your fingers in my face, defy my advice, exceed my instructions and then refuse to do as I dictate for the good of my command. The complaint has been transmitted and I intend to follow it with all vigor. Devise that weapon and I will do what I can to mitigate the severity of the reprimand you will certainly receive."

"Then you refuse to give me any further help?"

"I refuse to let you command this post, sir!"

Gedso looked uncomfortable and unhappy. He finally turned to the door and laid his hand on the knob. He was trying to think of something further to say, but failed. The door stuck and came off its shattered hinges before he could lessen the slight jerk he had given it. Amid the ruins of glass he looked apologetically at the apoplectic general.

Stewie got up from the orderly bench. "Did he refuse?"

"Yes," said Gedso.

"You got any further ideas?" said Stewie.

"I can appeal to my superiors—but they dislike technicians who have to resort to them."

"Well," said Stewie, wrinkling up his stub of a nose, "all I can say is that one way or the other I'll get it. I never did like those acid baths they use. How bad do you want to go on past the mines?"

"Unless we do, there won't be any mines within the year."

"And there won't be any Stewie in two days. Didn't you show him any facts? I couldn't make anything of anything, of course, but he ought to be able to figure out what you're adding up."

"He wouldn't look at my data. These military men can think only in terms of weapons and he has been angry from the first because he thought I came here to devise something better than the arc cannon and then wouldn't do my job. He says I'm stalling."

"Uh-uh," said Stewie with a thoughtfully half-closed eye upon a cargo ship which was landing. The ship was disgorging new tanks of the latest pattern. Soldiers were rolling them into line and, as fast as they were started up, were driving them toward the shops. Stewie grinned.

Gedso followed Stewie's gaze and then understood. Together they walked toward the ramp down which the tanks were being disgorged from the ship.

"Are they what you want?" said Stewie.

"They will do very well," said Gedso.

Stewie took a position at the bottom of the ramp and the next tank which came down stopped rolling just beside him. He climbed quickly to the turret and in an officious voice, began to give directions for its alignment in the column. Caring very little, the convicts pushed.

Gedso climbed through the portway and, glancing over the rocket turbine, threw the fuel feeds and switches on. Stewie dropped down and into the driver's seat and touched the throttles, letting the tank creep forward. At the machine and fuel shops, Stewie paused beside the crystal chutes and the automatic loaders crammed the storage compartment full. At the armament shed a bundle of electric cartridges rattled into the magazine.

Then a footfall sounded upon the slope of the metal giant and the hatch was jerked open. A pair of officers' ironplast boots dropped into sight and a familiar face was thrust, with startled expression, into Gedso's. And before a word had passed, General Drummond, inspecting new equipment as a good officer should, dropped down beside his trusty Blufore. Drummond was not as quick in sensing the situation.

"Very good, very good. Perhaps they appreciate us just a little after all, eh, Cascot? These

seem well built and well armed. Far too comfortable, though, for their cre—Saints!"

Blufore had been trying to say something for seconds, but he had an abnormally strong hand over his mouth.

Drummond was thrust into a seat by Gedso's other hand and the hatch above slammed shut, leaving the place lighted only by the sparks which escaped the rocket turbines.

"What is this?" cried Drummond.

"I don't know," said Gedso, "of two officers who could be of more help. I hope you won't mind. I'm sorry, in fact. But the Scienticorps appropriated and commandeered this tank before it was receipted into your command. Therefore it is technically my command. I am sorry, but we have too much to do to be stopped. Please, pardon us."

"Let us out of here this instant!" brayed Drummond. "I'll have my guard tear you to bits! I'll have your card! I'll get you a court martial that they'll talk about for years. This is kidnapping!"

"This is necessity," said Gedso. "I am sorry. Drive, Stewie."

An astonished patrol on the outer wall gazed upon the spectacle of a charging tank which swiftly burned its way through the spun silica and raced into the rocky distance to be lost in the immensity where no tank or ship or division had ever ventured before.

At the far end of the vaulted chamber, Technician Brown, deaf to the violent stream of objection which stormed about him, consulted a chart of his own drawing, a cartographic masterpiece which read in three dimensions having been constructed out of descriptive geometry.

"Ahead, over that hump," said Gedso, "there should be another tunnel, probably not more than two kilometers wide. You will need much power for the going will be very rough and the grade very steep."

"Aye, aye," said Stewie. "Why don't you bat those guys one and make 'em shut up?"

This speech from a convict gunner was entirely too much for General Drummond. His eyes dilated and his nostrils flared like those of a battle horse of Gerlon about to charge. Thus, Stewie had the desired quiet long enough to get the tank through a particularly rough area and climb the indicated hump.

There ahead was the passage which Gedso had predicted and Stewie spent a little breath in admiration. "Gee, how'd you know that that was going to turn up right there? You act like you'd been here before."

"No man has ever been here before," mourned Blufore, a-wallow in self-pity, "and no man will ever be again."

Drummond was given much satisfaction as soon



as they started down into the mouth of the ascending tunnel for, in a space of instants, a weaving mass threw itself in their way. The "things" choked the channel and then swept back along its sides until both the advance and the retreat of the tank were covered. It was impossible to clearly make out their maneuvers or numbers, for one received only an impression of vague hugeness on the march as though mountains were moving.

Stewie looked alertly to Gedso for orders.

"Transfer gravity," said Gedso. "Perhaps they won't be able to rush across above for a moment!"

A new whining note cried through the ship and the gymbals in which the control room was suspended creaked as they allowed the room to invert. With a crunch the tank struck against the upper side of the tunnel and, scrambling for traction, began to run there. Below the moving horde flowed ominously along, joined every moment by additional thousands.

"You'll never make it," said Drummond. "This crackpot craving to explore will cost all of us our lives." He seemed to find much gratification in the fact.

"Please," pleaded Stewie, "can't we jettison that Jonah?"

"There's a fork of the tunnel just ahead," said Gedso, studying his chart. "We go to the right."

"Right or left," said Drummond, "you'll never make it, you clumsy lout!" He got up. "I order you to return instantly. If you do not obey, I'll . . . I'll have you shot!"

"Please," said Stewie, "can't I spring that under hatch and let him out?"

"We turn into the main tunnel here," said Gedso, pointing.

They entered a cavernous place, larger than the mines, larger than any interior so far seen. The weirdly glowing walls curved down to a crystal-strewn floor forty-three kilometers below them. Moving on the debris were the legions of "things," augmented in number until they congested the tunnel.

"Thank Jala they don't fly," said Stewie. "How much farther do we have to go?"

"About seventy kilometers," said Gedso.

"And then what do we do?"

"Then we'll probably run into the main body of the 'things.'"

Stewie frowned for a short time, trying to figure out if Technician Brown meant to attack the main army with one flimsy tank. But thought was irksome to Stewie over a certain duration and he lost himself in the management of the tank.

After a little, the passage ahead became blocked, at least so far as Stewie could tell.

"Keep going," said Gedso. "There may be a narrow space at the top. That stuff up ahead will be moving and so don't lose control."

Approaching closer, the movement was perceptible, resembling a slow-motion avalanche. Reaching the upper rim and perceiving an opening, Stewie tried to make the tank climb straight up. But the traction was bad and with a lurch it fell backward to strike heavily upon the rocky slide. It spun on one track, fell over and, with racing turbines, clawed upward over the treacherous ground. Drummond dabbed at a cut on his forehead and glared in a promising way at Stewie's back.

At the top they found themselves in close confines and had to pick their way through passes in the rock. They traveled several kilometers before they could again find clear travel and then only by using a steep wall as their roadway.

The "things" had been left behind for some little time, but now they came upon an isolated beast which scuttled down at them like a mountainous spider.

Stewie pressed the electrode triggers and the arc licked thunderously out to lock through the body. The "thing" closed over the tank, engulfing it and tearing it away from the wall. A gigantic maw was opened and they were sucked into it on the rush of air which, hurricanelike, spun them and toppled them down.

Gedso flashed on their flood lamps and the interior of the "thing" showed about them in dirty confusion. The tank settled to its gravity side and the tracks churned in the soggy morass.

With a swift change of fuel feeds, Gedso brought the reactionary tubes into play and the tank slammed itself against the inside wall which indented and then snapped back into place, hurling them across to the far side.

"Hold on and try it again," said Gedso.

This time the reactionary blast let them gather momentum. There was a roaring sound as the inner lining of the "thing" ripped. The sides of the wound clamped down and held the tank fast. Stewie shortened the arc to minimum range and played it full blast upon the outside scale wall. Smoke obscured their vision through the ports.

"Try her traction now," said Gedso.

The turbine sparked and spewed out ozone. Slowly and then with a charging rush, the tank blasted through. Stewie steered for the high wall without a backward glance at the death agonies of the "thing."

Drummond was shaking and glassy-eyed, but he held to his nerve. "If you've learned enough," he said with acid-dripping words, "perhaps you might make it back."

"Too many waiting for us back there now," said Gedso. "There are smaller tunnels they can block completely."

"Then what do you mean to do?" flared Drummond.

"Up this incline and through that slit," said Gedso to Stewie.

The tank scrambled up the wall and darted through.

It was as though they had come upon a conclave of the "things." Or an ambush. The place was packed with them and the walls were less than a thousand meters apart and not eighty meters high.

"Up!" said Gedso. "Reverse your gravity!" And then, "Hold on at the top here."

Below the "things" had awakened to the presence of the interloper and now began to tumble over one another and climb on backs to strike at the object above them. Other "things" poured into the cavern and, by sheer volume, the height steadily decreased.

Gedso was staring anxiously around the interior of the place into which they had come. Here the walls were not flat, but arranged in a regular pattern of hummocks. And at the end was one particular knoll, much bigger than the rest. The range to it was about two hundred and twenty meters.

With powerful hands Gedso poised the arc cannon and led drive at the hummock. The green-yellow streak lit up the crawling scene below.

"Advance on that target," said Gedso.

Stewie eased the tank forward, trying not to look at the thickening multitude which was coming up to them. Smoke was flying from the hummock and the top of it was becoming charred. As they approached they could see that it was a nub of something which, in gigantic volume, reached out beyond. The arc cannon ate steadily into it, biting off dozens of cubic meters a second, for the stuff appeared to be very soft and highly inflammable.

A feeler was touching the tank now and then, with decreasing intervals and increasing force.

The arc cannon had started the hummock burning and now it began to char under its own combustion, disappearing in smoke in cubic kilometers. Then the smoke volume was so great that not even the arc was visible in it.

A heavy blow against the tank knocked it loose. It was knocked about with swift ferocity in the sea of angry "things" until a maw spread apart and dashed them in.

They tumbled down a passage much larger than that of the "thing" which had taken them before and a bony structure, visible to their floodlights, reacted upon three of the occupants of the tank like steel bars upon a prisoner.

Finally, bruised and shaken, they came to rest, half sunk in mire.

With a final sob of despair, Blufore hid his head in his hands and cried. Drummond looked steadily at Gedso.

With a shrug, Stewie said, "Well, we sure gave

them a hell of a time while we lasted. There's enough air in the containers for maybe a day and after that—well, maybe he can digest armor plate."

Gedso sat down in the engineer's seat and stretched out his legs. He took an apple out of his pocket, polished it upon his sleeve and took a soul-satisfying bite. "I wouldn't worry too much," he said, glancing at his watch. "We'll probably be out of here before that day is up."

"A lot of good that will do," said Drummond. "We'll never get back."

Gedso finished his apple and then composed himself. In a little while he was asleep.

Some time later, at Gedso's order, the tank moved slowly up the way it had come and, much to everyone's—save Gedso's—surprise, there was no resistance to their return through the maw which gaped stiffly and made no effort to close even when they churned out over the lower jaw.

Although some smoke remained in the small cavern, only charred ruin marked where the hummock had been. And there were no "things" to bar their way, only sodden lumps strewn about in stiff attitudes.

Stewie guided them along the return route, but nowhere did they find anything alive. The contrast of this with their recent difficulties made even Drummond forget his quarrel, and Blufore gazed hopefully about.

"What's the meaning of this?" demanded Drummond, pointing out yet another vast pile of motionless "things" which lay open-mouthed in a tunnel, not even moving when run over by the tank.

"That's the way things are," said Gedso indifferently.

"I . . . I'd like to know *how* they are," said Drummond.

"You'll probably get a copy of my report," said Gedso. "To the left here, Stewie."

"I probably won't get that for a long time," said Drummond, pouting. "I ought to know so as to regulate the activities in my command." He looked pleadingly at Gedso. "What did going 'outside' have to do with this?"

"Had to find out about the Black Nebula," said Gedso matter-of-factly. "Right, Stewie. Right and down."

"Well, damn it, what about the Black Nebula?"

Gedso turned toward him patiently in surrender. "The Black Nebula isn't a barrier in the sky. I'm not sure what it is. A fold, perhaps. I don't know. I had to get pictures of this area from out there." He reached into his pocket and brought out a photomontage. "Reduced the pictures after they were taken with an inverted telephoto. Got this."

"Why, that looks like a leaf," said Drummond. "And what is that on the leaf?"

"A leaf," said Gedso, "and on the leaf, to you, a caterpillar worm."

"You mean this is a picture of the 'outside'?"

"Yes. The Crystal Mines are in the liver of that worm and the crystals are so valuable because they are, of course, highly condensed cellular energy."

Drummond was round-eyed with awe. "Then . . . then I am the outpost command of a world beyond the Black Nebula, a world so gigantic that even a worm is thousands of kilometers long!"

"When I inspected the Black Nebula," said Gedso gently, "I discovered that it was not a barrier in space, but a fold or some such thing. As I say, I don't know. I only know the effect. Ships approaching the Crystal Mines undergo a sort of transformation. The reason so many never return is because they fail to reverse that transformation and so hurtle through the hundreds of light-years forever, no larger than microscopic bullets."

"What's that?"

"Well, according to what we found, a diminution of size takes place. The worm is just an ordinary worm on an ordinary leaf. And the 'things' are just ordinary phagocytes. If we proceed in the future to burn out the heart of the worms we mine, then we will have to do no fighting. Because of a changed time factor a dead worm will last for years. And if we watch certain manifestations in the spaceships, we can get them to keep penetrating the Black Nebula until they are again restored to size. I took a chart of the interior of these worms out of a text on entomology, once I had determined the kind of worm it was—"

"Then . . . then my command—"

"Why, yes," said Gedso, "I think it is so. You need have no worries about your command. No more fighting, better conditions, more crystals mined—"

"But," gaged Drummond, deflated and broken, "but my command . . . is just the liver of an ordinary worm . . . perhaps in a tree in some farmer's yard—"

Stewie grinned as he steered across the plane to the wall of the Crystal Mines. He took another glance at the haggard General Drummond and pulled up at the wall.

When fifty thousand convicts, the following day, cheered themselves to a frenzy carrying Gedso Ion Brown, Technician, Extra-Territorial Scientifics, to his waiting transport, General Drummond was not there. In the dimness of his quarters, amid his presentation pistols and battle trophies, he heard the racking waves of triumphant sound sweep the mines again and again for minutes at a time.

General Drummond sank into a chair and cupped his face in his hands.

Wearily he repeated, "The guts . . . of a worm."



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# Doc SAVAGE



# FUGITIVE FROM VANGARD

By Norman L. Knight

● The stranger wore clothes a thousand years out of date. He had no memory of where or when he had been born—

Illustrated by Orban

The pergola on the hillside overlooking the lake was more than mere clever architecture; it was arrested motion in tangible form. It seemed to have gushed up out of the earth in curving jets and fans of translucent blue-green fluid streaked with white foam, which had interlaced to form a graceful vault and then by some enchantment remained suspended. In the cool twilight it gleamed with a liquid sheen, reflected splashes of vivid orange from the cirrus cloud streamers which arched across the evening sky like giant brush strokes of fire. From the pergola a triple archway opened upon a softly lighted underground retreat in the depths of the hill.

From this subterranean portal a man emerged hurriedly and spoke to the girl who stood at the edge of the pergola, expectantly searching the northerly sky with her eyes. Both were cloaked against the evening chill by garments that would be inadequately described in terms of fabric;



they were woven nebulosities aquiver with numberless infinitesimal points of light, and radiated a gentle warmth.

"Here's Bonneweir's report, Evandene," the man announced. "It was just now transmitted. He called me this afternoon from the Melvil Island spaceport, you'll remember."

"About the unfortunate who calls himself Inconido?" inquired Evandene. "Let me see it, Fenross."

"Why should anyone choose a name like 'Inconido'—the Unknown One?" Fenross wondered, and handed a small flat box to Evandene. "It sounds melodramatic and immature. As if he considers himself a romantic figure, a man of mystery."

"People take all kinds of fanciful names," observed the girl, and scrutinized the little rectangular object which just fitted into the palm of her hand. She pressed the edge of it with her thumb; at once an oblong strip across its flat surface became luminous and a stream of black characters flowed across the illuminated panel from left to right. The essential part of the message which they spelled out ran thus:

This is for your files, and to confirm our earlier conversation by stereo. I am sending you this individual who calls himself Inconido. He maintains that he has killed a man in a moment of stress, and if this is true, obviously he belongs at the Becnaltam Clinic. He carries no identification and would tell me nothing more than the bare fact of the deed. He feels that he should disclose no details until he has consulted with someone who specializes in such matters. He said something about "giving himself up." We found him a stowaway in the Colonial *M. C. H. 103*, which was relayed in from the squadron of the Census fleet now operating in the Lesser Magellanic Cloud. I don't know how he managed to smuggle provisions for an eighteen-month voyage into the hull, but he must have done so. The bill of lading shows nothing edible in the cargo. Our first thought was to feed him, but he refused very curtly. You should see that he is properly fed as soon as he arrives at Becnaltam.

Unless the victim was another stowaway—and the unloading so far has revealed no evidence of this nature—the killing must have occurred before he stowed away. Perhaps that was why he stowed away. Although his intelligence appears to be above the average, he is moody and suspicious. You will find him an odd and difficult character, but I have every confidence in your ability.

"I'm a little hazy about the meaning of 'M. C. H.," remarked Evandene, as the flow of characters ceased. "What kind of a ship is that?"

"Motorless cargo hull. They relay them from port to port along calculated orbits. An impetus tug takes them out and gives them a push; another one meets them and brings them in. They travel without a crew unless they carry live cargo. Don't you remember the book we heard? The one about the crew of a cargo hull that got off its course. Was it 'Interstellar Coffin'? Or was it—"

"I think our man's due to arrive very shortly," interrupted Evandene, pointing toward the fading banners of cloud in the northwest.

A fiery mote had detached itself from a glowing cloud and was sinking earthward, growing larger as it sank. Its brilliance dulled and vanished as it descended into the Earth's shadow. The craft became invisible against the darkling sky, reappeared

as an enlarging black dot against another cloud streak nearer the horizon. Then it was swooping down upon them, slid to a full stop a thousand feet above the lake, revealed itself as a dark, smallish torpedo shape.

The air transport emitted a steady musical tone—so deep in pitch that it was a shuddering of the air rather than a sound—as it floated vertically downward on an even keel, almost met its reflection in the dark-green mist-filmed waters, glided shoreward, and grounded its prow against the foot of the slope below the pergola.

A port opened in the side of the vessel, projected a curved beam of light upon the lake beach, then expelled a human form along the beam like a wind-driven leaf. This individual drifted down upon the beach—clawing at the air for nonexistent hand holds—alighted unsteadily, and staggered out of the glare of the beam. During his brief aerial transit, one could discern only that he was clad in garments of dark-colored material. Two other figures in lighter and scantier garb followed him from the open port, skimming along the parabola of light with easy precision.

"The first one must be Inconido," decided Fenross. "He didn't act as if he were at ease in a landing beam."

Voices were audible from the trio at the foot of the hill. One gathered that Inconido was being directed to proceed to the pergola. Then his two companions described twin arcs along the beam and into the ship; the beam vanished; the port closed, and the vessel vaulted into the skyward dusk. The inrush of air in the wake of its ascent raised a flurry of waves in the lake.

Fenross and Evandene started down the slope to meet the newcomer. At first, he did not notice their approach and climbed the grassy incline slowly, with frequent pauses. At times he seemed to be regarding the hundred-foot sycamores which grew along the lake shore. Then he surveyed the sky, in which the greater stars were now visible. He knelt twice and felt of the turf.

"What clumsy clothing!" Evandene quietly remarked to Fenross as they drew nearer to Inconido. "His legs are in sleeves."

"Trousers, I swear before the stars!" Fenross responded. "This is the first time I've seen them outside of a book or a pageant. Trousers, and a coat and vest! I wonder if he carries a spring-motored watch? What kind of masquerade is this?"

"There's something wrong with the shape of his head," continued Evandene. "No, it's something he has on it. What is it?"

"It's a hat," declared Fenross, peering and frowning. "A very ugly sort of hat. An inverted bowl of sheet metal, as nearly as I can make out, with a flange all around."

The stranger now discovered the proximity of Fenross and Evandene, and stood gaping.

"Good evening, and welcome," Fenross greeted him. "You are Inconido?"

But Inconido was in the throes of an obscure emotional struggle and did not hear. When he spoke, it was in a voice of sheer astonishment.

"Are you Fenross and Evandene?" he demanded. "I am Fenross. This is Evandene."

"You are my attorneys?"

At the sound of this archaic word, Fenross' eyebrows became arches of interrogation.

"We are your counselors," replied the girl. "You are to live here for a time, with us, while we consider your personal difficulties."

"Counselors, then. But you're not what I expected."

"What did you expect?"

"Well—certainly not two people draped in . . . in clouds of stardust. And you're going to defend my case?"

"No one is going to attack your case," Fenross assured him. "To the best of our abilities, we shall determine why you got into trouble and how to avoid a repetition. But there's no need to plunge headlong into a discussion of these matters now. Tomorrow, or the day after, we may begin. First you should refresh yourself. Your lodgings are prepared and ready."

As the three ascended the slope together, both counselors were wondering secretly as to the stow-away's racial classification. Even in the fading light, it could be seen that the features under the brim of the hemispherical hat were of a decidedly dusky hue, with a satiny gloss. But they were not definitely Negroid or Nordic or Semitic or Mongolian. They might have been a product of the complete, ultimate blend of all Terrestrial races.

When they mounted the short flight of steps leading to the pergola, Inconido stumbled and was steadied by Fenross. For a moment the counselor grasped Inconido's hand and was caught unawares by a grip of bone-bruising power. He noted that the hand was feverishly hot.

On the last step Inconido turned upon his companions with a defiant air.

"I'm not satisfied," he declared bluntly. "You don't answer me directly. You baffle me; you don't seem real. The little that I've seen of this world—that doesn't seem real either. I arrive on the shores of an ocean filled with floating ice. I go aboard a craft that shoots up to a horrible altitude and outruns meteors. Then I'm tossed out into midsummer. I demand an outright answer to these questions: Will you defend my case? When shall I be tried? What penalty may I expect?"

"We can't defend your case because there will

be no trial," Fenross informed him. "No trial and no penalty. This is a Human Relations Clinic, not a place of punishment as you seem to think. Our concern is social pathology."

"You mean—there'll be no jury? No sentence? Does my whole fate hang upon what you two decide?"

"Shades of the Dark Ages! Where has he been living?" thought Evandene.

"There will be none of those things," affirmed Fenross. "And we should be presumptuous if we didn't confer with others. We are your personal advisers and confidants; you need see no others, talk to no others, until you feel that you are prepared. You need not talk to us of your difficulty until you are ready. We prefer that at first you should talk of other things."

"But I don't want to talk of other things."

"Very well," consented Fenross. "We'll sit here, on these steps—so—and you may speak whatever is in your mind. But your first consideration should be an adequate meal, and sleep."

"Never mind the food, and as to sleep—I don't sleep."

"Insomnia?" queried Evandene. "How long has that been going on?"

"It isn't insomnia. I simply don't sleep and feel none the worse for it. I know it's abnormal; that's only a part of what disturbs me. I haven't slept for years—for as long as I can remember."

"You mean that you haven't slept since sometime in your early childhood?"

Evandene's tone was incredulous.

"No, I don't mean that. Perhaps I didn't, but I can't remember that far back. That's another thing that distresses me."

"How old are you?" Fenross inquired.

"Oh, it isn't that my memory is failing—not that way. It just comes to a dead end. Begins there, rather."

"Amnesia! Now we're getting somewhere," Evandene said quickly. "What is the first thing that you can remember? Is it a distinct memory?"

"Photographic," responded Inconido. "It was night. I was standing on a street corner, resting one hand on a pole of splintery wood which supported an arc lamp. The lamp shed a cone of depressing blue-white light. The street and sidewalk were paved with ocherous red brick, full of broken bricks and holes. There had been rain; everything was wet with a slimy sort of wetness. The air was misty and smelled of damp mildewed wood and decaying fruit. On the corner was a drugstore, with a globe of blue liquid in the window; a gaslight with a broken mantle was behind the globe, shining through. There were no other

lights to be seen; beyond the circle of the arc lamp was foggy reddish twilight. The wind rustled some muddy newspapers in the gutter. I was filled with uncanny fear and bewilderment, as if the bottom had dropped out of my world, and was staring at a small object which I held in my other hand. I couldn't remember what it was for. I don't know how I came to be there, and I don't know who I am."

"Drugstore. A broken mantle," Evandene repeated slowly. "What does that mean?"

"You were dreaming," declared Fenross. "It couldn't be. What you describe would be a street in a twentieth century—perhaps a nineteenth century—city."

"But it wasn't a dream," insisted Inconido. "It went on. I lived there nearly five years. I got along, after a fashion, doing odd jobs. I was there when your Census ships came. I'd never seen such ships before. And the people who came in them, with their talk of Earth, the Mother Planet, and of other worlds— It was a revelation. I hadn't imagined— I felt as if the heavens had opened."

"Do you mean to say that you hadn't heard of Earth until then?"

Fenross' voice was eloquent of amazement.

"I'd heard it mentioned casually. I made no friends, and mingled with other people only by necessity. Outside of working hours, I was a recluse. In so many ways I am—not normal—that I dreaded having anyone know me too well. I kept moving from place to place."

"What is the name of this world?" inquired Evandene, intensely curious.

"They call it Vanguard. Haven't you heard of it?" It was Inconido's turn to be astonished.

"Never," asserted the girl positively. "There are a dozen points in your story that whet my curiosity. For instance, the object that you were holding in your hand—what was that?"

"I still have it. Perhaps you can tell me what it is. I'll show you."

While the three had conversed on the steps of the pergola, darkness—starred with winking constellations of fireflies and vocal with crickets—had closed in about them. Came a rustling sound as Inconido searched the recesses of his coat.

"Here it is," he announced.

"But we can't see in the dark," Evandene pointed out.

"So—you're just like the Vangardifs. They couldn't carry on at night without lights everywhere. Right now I could read a newspaper."

"Newspaper?" echoed Fenross. "Never mind; we'll stick to the matter in hand. Our vision is merely normal, so we'll have a light."

He extended his left hand, and the dial of the timepiece at his wrist flashed into mellow white radiance.

"How did you do that?" asked Inconido.

"I clench my hand and the wrist muscles do it; it turns off the same way. Let's see your souvenir; it may give us a clue."

Inconido displayed a small black cylinder, about the length and thickness of a man's little finger, linked to an oblong of vitreous brown material. Part of the free end of the latter had been snapped off diagonally. On one side, in indented letters, appeared the word INCONIDO, and on the other an indented figure 7.

"Why, this must be something that belongs to you!" exclaimed Evandene. "Your name really is Inconido!"

"It may be," he conceded. "I can't say. I've been going on the theory that it is. And there's something else that I forgot to tell you. That first night on Vanguard, when—"

He checked himself, held up a hand for silence, sat tensely for several seconds in a listening attitude. Nothing was audible to the counselors save the seething rush of water over the dam at the end of the lake—the dam which the ancient Americans knew as Bagnell—and the clicking whir of insect voices.

The light from the luminous dial, shining on Inconido's face from below, grotesquely emphasized his eyes. It illuminated the upper arches of the orbits, shadowed them underneath. Evandene noted with a start that his irises were yellow with the hard yellowness of brass, as in the eyes of an eagle. Under his coat were two flat metal cases strapped against his body, one under each arm.

With a deep intake of breath, Inconido announced at last, "It's gone."

"What is gone?" Fenross inquired.

"The music. Did you hear it?"

"No. Do you often hear this music?"

"Spasmodically. It comes and goes. Sometimes I hear voices."

"Prophetic voices?"

"You think I'm mentally deranged. Perhaps I am. I worry about that also. No, they're not prophetic. They don't even make sense—just fragments of sentences. I'd rather not talk about it."

"Just as you say," Fenross agreed. "Let's get back to this keepsake of yours. I can tell you what it is; it's a key—the key to a magnetic lock. Judging by its size, I'd say that it's the key to a rather sturdy lock, possibly a door lock. And since the tag is numbered, I'd guess that the door was one of a series. Does that suggest anything to you?"

"Not a thing. And this isn't the sort of key

that people use for their house doors on Vangard. They use regular door keys."

"Does one lock one's door on Vangard?" Evandene queried with a note of protest, wondering meanwhile what a "regular" key might be.

"Naturally. Everything's locked up at night. Also the door of one's lodgings when one goes out, day or night. All valuables are kept under lock and key. That's only common sense."

"It may be common sense on Vangard," commented Fenross, as he extinguished the light from the dial, "but it indicates a very insecure state of affairs—a community of barbarians, in fact."

"You said that you forgot to tell us something," prompted Evandene.

"So I did. When I found myself on Vangard, I was wearing garments different from these—a sort of tunic, short breeches, and tight knee-length boots. They made me conspicuous, and as soon as I realized that I am—different—I got myself clothing like this."

"Your description doesn't tally with any human garb that I know of," observed Fenross. "It should help us in tracing your native world. We'll investigate that."

"These people of Vangard—the Vangardifs, as you call them—are they human?" continued the girl.

"Definitely. Nevertheless they are an unpleasant lot. They irritated me beyond measure with their wranglings and taboos, and I couldn't justify myself for feeling that way. They are perverse, destructive and maddeningly self-assured. They knew all the answers, so I doubted myself. I wanted to get away, and didn't know that it was possible to get away."

"Then your Census ships came and there was a big stir. The Vangardifs refused to be questioned and counted and indexed. They said it was an invasion of their sovereignty. So your Census people made a deal. A delegation from Vangard would be sent back to Earth to get first-hand information about conditions there—I mean here—and if they were favorably impressed, the Census was to go ahead. I asked to be included in the delegation, but it was no go. The Census squadron had only one small passenger ship which it could spare temporarily, all the accommodations were reserved for people who wielded influence on Vangard, and I was a nobody. I was promised passage when and if Vangard permitted regular transport service to be established."

"Then I heard about this motorless thing, a sort of projectile which the Census was going to toss back to Earth. They were sending a load of preliminary information and specimens which they had gathered unofficially."

"I resolved that I would be in it and that nothing should prevent me. If I could make you understand how intensely I detest everything about Vangard—"

"So I promoted myself a job, loading the stuff into the cargo carrier. It came in small consignments from all over Vangard, at irregular times. There were machines that did the actual labor—at least, they looked like machines; I was told that they were machines, but they obeyed spoken commands. They were like well-trained animals. And they could float around in the air. They gave me the creeps at first—but I'm wandering from the main topic."

"Since the stuff arrived at all hours, I was allowed to live aboard the craft as a resident receiving agent. You can see how this fell in with my plans. Sometimes for an entire day there would be nothing to do, and I explored the hull from stem to stern. The interior was mostly cargo space. There were tiers of closed lockers and compartments built after the pattern of bookshelves in a library, on an enlarged scale. There was a separate section with cages for live cargo, a cabin for an attendant—which was my temporary quarters—and a water tank with a manhole. Since there was to be no live cargo on this trip, and therefore no attendant and no water, I decided to stow away in the water tank until after the vessel was launched on its course."

"There was the problem of fastening the manhole cover after I was in the tank. Otherwise it would attract attention during the final inspection before launching. And there was bound to be an inspection. I had already made an urgent appeal for passage to Earth; if I disappeared just before the cargo hull departed, there would be a logical suspicion that I had hidden myself somewhere within. So the cover had to be fastened, and—even more important—unfastened later. It turned out to be no problem at all, but that's incidental."

"At the first opportunity I made an experimental entry into the tank, fastened myself in, and came out again. Just as I came out, I heard someone call my name. I looked down, and there was a man on the deck. He had come with the Census Squadron, but I hadn't spoken with him until then. He was clad in a mesh of steel links, and he was white. I don't mean white as one usually means it in reference to people; this man was really white, like snow."

"He asked if I were Inconido who had asked for passage to Earth, and I admitted that I was. I climbed down from the water tank, feeling very agitated. Then he said that he had been inquiring about me, here and there on Vangard, and wanted to verify some of the things he had discovered. His manner was quite friendly, but he



frightened me. Then he said, 'Come and have dinner with me and we'll talk things over.'

"So I strangled him."

Both counselors had, in the course of an extensive practice, received confessions of murder. But they had been psychologically uncomplicated murders following an almost predictable pattern. Inconido's confession was, as it were, flung in their faces. They uttered simultaneous inarticulate cries of startled astonishment.

In the darkness they could not see Inconido's face, but his next words were spoken painfully, as by one who conveys abhorrent information.

"Of course, you don't see the connection. But I felt that he knew . . . about me, and that his words were a trap, a device to sound me out. You see . . . my food habits . . . are not those . . . of a sane human being. If I had told him the truth . . . then he would have known, everyone would have known about Inconido, Inconido the monster! I would have been forbidden passage to Earth forever. I would have been thrown into one or another of the abominable lockups that they maintain on Vanguard, pending execution.

"Please don't ask me to explain myself. I suppose that I'll have to tell you eventually, but not now."

He paused. Among the sycamores, the lights from scattered hillside portals of the clinic shone like glowworms.

"He was remarkably easy to strangle," Inconido continued. "I had barely grasped his throat and pushed his head back against a tier of lockers when he went limp and slumped down at my feet, stone-dead. I hadn't exerted any real pressure.

"At first I was panic-stricken. How to dispose of him, that was the question. Then it occurred to me that I didn't need to dispose of him. I would simply shut myself up in the water tank. Someone would find him; I would be gone; therefore it would be assumed that I had fled the scene of the crime. No one would think of looking for me in the cargo hull.

"It worked out perfectly. The loading was almost finished when I went into the tank, and I couldn't have lain hidden more than a day or two. Then came the whirring and quivering of the tug making fast to the cargo hull, the rush upward, then a reeling sensation which I suppose was due to the launching. After that, not a hint of motion, and perfect silence. So I came out."

"Did you have a light?" asked Fenross.

"I didn't need one. I could see by my own light, and there was a sort of glow everywhere in the hull, just as there is here."

"What do you mean—'by your own light'?"

"I had forgotten—you can't see it. It's a sort

of personal nimbus. You have it also, both of you, but paler than mine."

"What color is it?"

"There doesn't seem to be a name for it. At first, I tried to ask the Vanguardifs about it, but it made people look askance at me, so I kept quiet about it thereafter. It's like red, only redder. It was sufficient to light my prowlings through the cargo hull. There were long lockers set into the decks between the vertical tiers, and I noticed at once that one of them glowed more brightly than the rest. It was stamped all over, in huge letters, with things like 'Rush' and 'Special Priority.' As the voyage dragged on interminably, I grew more and more curious about it. Finally I opened it.

"Inside was a long metal case, solidly wedged in. There was a round window in the top, at one end, and behind the window was the face of the man I had strangled. His eyes were closed, and he was frowning as if he were perplexed.

"That finished me. All the rest of the voyage I felt that he was listening, following my movements as he lay there in his locker. It was a relief to give myself up."

Following these disclosures, Inconido truculently refused medical examination or treatment for the fever which Fenross had noted, but was persuaded to retire to the quarters that had been made ready for him. They adjoined the artificial cavern beyond the triple archway in the hillside. He found it difficult to believe that this chamber was, in fact, a cavern. It was floored with compact turf. The irregularly spaced columns which supported the ceiling were the trunks of sycamore trees in realistic facsimile. The interlaced branches of these counterfeit growths formed a trellis for the knotted ropes of living wistaria vines which entwined the pillars with serpentine spirals. Light sources between the leafy overhead screen and the ceiling shed an illumination now modulated to simulate moonlight. A fluctuating forced ventilation rustled the leaves with the semblance of a fitful wind. The walls of this subterranean lobby were angled mirrors which permitted an observer in the midst of it to see his own reflection nowhere; instead, he seemed to be looking into endless vistas of moonlit forest in all directions. A mirrored panel slid aside and revealed the lighted interior of the stowaway's lodgings with a magical effect, as if a four-dimensional portal had opened among the trees into another region of space.

When the sliding panel had closed behind the stranger from Vanguard, Fenross turned to Evan-dene.

"Unless Inconido takes us completely into his confidence very soon, we may be forced to invade

his mind," declared Fenross. "I'm convinced that the man is physically ill, in addition to being somewhat unbalanced. I'd like to mount a recording camera in his room; it may be that he merely imagines that he doesn't sleep. In fact, I'm wondering just how much of his entire story is fact and how much is hallucination. He claims to hear music and voices. And this person whom he thinks that he strangled—the man who was all white, like snow—that must be either pure or partial hallucination."

"There is one such person," Evandene reminded him.

Fenross searched his memory, comprehended, and dismissed the idea with a shrug.

"Kordistell? That's fantastic. What could an unarmed human being do to Kordistell? He could have held our Inconido powerless, with one hand."

An ambiguous sound pervaded the cavern, a sound with a muffled quality that suggested a source in a closed room—Inconido's room. It began as thin whine which rose in pitch and volume, became shrill and rasping, declined and rose again, ceased, and then proceeded to repeat itself.

"What can he be doing, and how is he doing it?" marveled Fenross, staring at the mirrored panel which concealed the source of the recurrent discord. "It sounds like something rapidly revolving—like a grinding wheel."

"It sounds," the girl amended evenly, "as if he were sharpening a knife. There were two carrying cases strapped to his sides, under that peculiar jacket of his. I suspect that we have here something more than a mere eccentric."

"If this world of Vanguard exists outside of Inconido's imagination, and if the cargo hull really came from there," reflected Fenross, "there should be other things in the cargo which will verify his story. I'm going to call Melvil Island."

He departed via another sliding mirror panel, seeming to vanish in midair between two sycamores. After a few minutes' absence, he returned, wearing a baffled expression.

"I've talked with Bonneweir," Fenross reported. "There's no doubt about Vanguard's reality. The delegation has landed on Melvil Island. He is sending someone who, he says, will clear up everything. He wouldn't say who it is. He seemed a bit—well, facetious—about the whole thing."

"There's a ship coming in now," the girl observed.

The air in the cavern shuddered under the impact of basso profundo vibrations. Outside, in the darkness framed by the triple archway, a torrent of light poured down in a luminous arc from a source obscured by the upper margin of the frame and moved toward the pergola, seeking among the trees. Under its brilliance, leaves and

branches became as incandescent metal. Bewildered birds shuttled through it, clamoring, like flakes of colored fire. It halted when it found the pergola, transformed the glassy columns into pillars of molten emerald.

Bonneweir's emissary descended the beam as if lowered by invisible cables, alighted on the pergola steps. This individual was an absolute, unblemished white from head to heel, with the whiteness of snow; under the fervid illumination he positively fluoresced and diffused a silvery brightness into the cavern. The glare reduced his features to a faceless white mask, relieved only by the startling blackness of his eyes. He was as devoid of hair as an anatomical model and wore nothing save a belt of steel from which a flat pouch was suspended over his right thigh. In referring to this being, one uses the pronoun "he" only as a matter of convenience, since there is no satisfactory pronoun applicable to an entity in human form, whose mental and emotional attitudes are essentially human, but who is neither male, female, nor bisexual—in short, a biological zero.

"Kordistell in person!" ejaculated Fenross. "So part of Inconido's story is true—but the murder is plainly a delusion."

At a gesture from Kordistell, the light beam was extinguished, leaving the faintly lit cavern impenetrably dark by contrast. A continuing quiver of the air marked the presence of the hovering air transport.

Evandene approached a tree trunk column and uttered the words, "Full daylight."

Obediently the voice-controlled switch concealed within the column flooded the chamber with synthetic sunshine.

Kordistell entered from the pergola and Inconido emerged from his retreat at the same time. The latter had removed his coat, his carrying cases and their supporting harness, but his hemispherical narrow-brimmed hat was still clamped on his head.

"Do I hear a ship aloft?" inquired the stowaway.

Then he saw Kordistell, and his jaw sagged.

"That . . . that's the man!" he stammered. "But . . . I choked him . . . with my own hands! He should be dead! He was . . . stowed in a locker . . . for months!"

"You are wrong on nearly every count, my friend," Kordistell responded affably. "First, I am neither a man nor a human being. Second, I was not dead—merely as dead as possible. Third, I was disabled by an electric shock, not by strangulation."

"Perhaps you didn't say what I think you said," Inconido wonderingly commented. "If you did, then I hope that none of you is as confused as I am. From here on, I'm merely an attentive lis-

tener awaiting an explanation. But, if you please, go slow and make it simple."

"Although your own case is much more interesting, perhaps I should speak first of myself," responded Kordistell. "In the first place, I'm not a robot, regardless of opinions to the contrary. I refuse to be placed in that category. It would be more accurate to say that I am more than a simulacrum and not quite a facsimile of humanity. I would rather be considered as—a neomorph, a new kind of life without precedent or ancestors, done in metal."

"Metal!" protested Inconido. "But you don't look metallic! And you didn't feel like metal when—"

"When you undertook to throttle me? Perfectly true, but I'm speaking of plastic metal, metal with the pliability and resilience of flesh, isotopically pure metal—but probably you have forgotten what that is. Let's call it metal in a special physical state, constrained to behave normally by an inherent, self-maintained stress. One might say much the same things of ordinary living matter. Does all this seem strange to you?"

"Utterly," Inconido morosely admitted. "I feel dizzy."

He seated himself on the greensward; the others followed suit.

"Inconido's memories begin on Vangard," volunteered Evandene, and briefly summarized the stowaway's narrative.

"Unidentified type of clothing among your first recollections," reflected Kordistell. "Probably a conglomerate assortment that you got together just before landing. They're very prim about clothing on Vangard. Even I had to be draped to avoid offending their ideas of decorum. And I can tell you about the key without seeing it; it was the key to your cabin on the transport that brought you. The whole region is somewhat primitive, and locked doors are the rule. The part of the tag that was broken off must have carried the letters 'I. S. T.' Do you commence to understand? *Inter-Stellar Transport Inconido*. That was the name of the ship, and your cabin was No. 7."

Kordistell smiled astutely at the triple crossfire of questions which this statement brought down upon him.

"Certainly I know your real name," he acknowledged. "Everything shall be made plain in due time, but first I want to tell you about Vangard. Vangard is a frontier world; it is also a tertiary colony. That is to say, the first settlers emigrated from another colonized world, which in turn was settled by emigrants from still another, which was populated by a band of native Earthlings. From three to four generations intervened between each of these migratory surges. The

original Vangard settlers came—about four hundred years ago, Earth time—from a community that had had very little direct contact with Earth. They were mostly rather young, with idealized notions about the Terrestrial past. Life had become too secure and uneventful, they said; they yearned for the romantic uncertainty and sturdy virtues of the twenty-fifth century. Why the twenty-fifth, I can't say; their ideas about it seem to have been none too clear. On Vangard they were going to be apostles of simplicity, pioneers of a return to the good old days. They scorned to provide themselves with what was then modern equipment and held a ceremonial destruction of machines before they set out.

"So before they had been on Vangard for more than a couple of generations, the settlement reverted to the latter part of the Dark Ages and started to work its way out, very laboriously. Their transport, the *Mayflower*, had been dismantled soon after its arrival. They practically recapitulated a section of Earth history and had to invent and discover many things all over again. Even now they're distinctly medieval and haven't progressed beyond the steam-engine stage, and a fumbling sort of electric power. Do you begin to remember any of this?"

The stowaway shook his head hopelessly.

"Not a particle. All I want to know is, who am I?"

"We're coming to that now," replied Kordistell, reassuringly. "You became interested in the remote frontier worlds. You traveled tirelessly, and broadcast your findings to a listening universe. There was a growing furor on Earth as you discovered one backward community after another of which there was no record, official or otherwise. No one on Earth had suspected that the human race had spread out as much as it had; no provision had been made to keep adequate record of so vast and intricate a process. Then about eight years ago, Earth time, when you were reporting from the region of the constellation Tucana, your reports ceased abruptly."

Fenross and Evandene were regarding the stowaway with expressions of dawning comprehension; they were quite familiar with the events Kordistell had described. Evandene was on the point of speaking, but was admonished by Kordistell in rapid pantomime to remain silent.

"In such a hat and costume," she thought, "almost anyone would be unrecognizable."

"You have here the author and instigator of the Colonial Census," announced Kordistell, laying a hand on the stowaway's shoulder. "Not long ago we apprehended a marauding rascal named Maquiel, the commander of the I. S. T. *Inconido*. He admitted that our friend here had paid him—at an exorbitant rate—for passage to Vangard.

We learned further that Maquiel refused to make an open landing on the planet, in an inhabited region; he had been there before, and had undergone a barbaric expression of public disapproval known as tarring and feathering. So he landed by night and left his passenger in a desolate tract near a small town. He had promised to return; he had been paid to return, but had no intention of doing so. And that, Ferradji, seems to take us up to about the time that your memories begin."

"Ferradji?" echoed the fugitive from Vangard. "So far as I am concerned, my name could just as well be Inconido, and I still don't know who I am."

"I have your complete history—dates, pictures, identification, everything," Kordistell informed him, patting the pouch at his belt.

Then, turning to Evandene, he directed:

"Take his pulse."

Evandene leaned forward, grasped Ferradji's left wrist between her fingertips for a few moments, and announced:

"There is none, of course."

"What happens here?" demanded Ferradji. "What is a 'pulse'? Should I have one?"

"You should not," rejoined Kordistell. "Inasmuch as you have neither heart, blood, nor a vascular system—only circulating streams of metallic ions."

He deftly removed Ferradji's hat, revealed a hairless expanse of dusky cranium, faintly iridescent, with a coppery tinge.

"You are well rid of this monstrosity," remarked Kordistell, as he tossed the hat aside. "Surely, you must have noted similarities between us. Have you not suspected that we are two of a kind?"

"What are you driving at?" cried Ferradji in a tone of horrified consternation. "Are you trying to say that I'm a sort of machine—an electric machine? That I'm not really alive?"

"There you have the makings of a very interesting controversy. It has been going on for several hundred years without finding a conclusion. When simulated life approaches the genuine article so closely that the difference is debatable, then what is the difference? I shall be happy to argue the matter with you. And there's no need to be distressed; you have already caused yourself much unnecessary mental anguish. You have everything to gain, nothing to lose, by knowing yourself for what you are. No one knows the probable life span of a neomorph, save that it may be of the order of thousands of years. You may look forward to a breadth and continuity of thought and experience beyond anything that is attainable by mere flesh and blood. You are exempt from the distractions of fatigue, sleep, sex,

and pain, and are invulnerable to most of the lesser kinds of physical violence. You may observe and comment on human affairs with an insight and detachment impossible to human beings, and therein lies the chief reason for your creation."

"You were not invulnerable on Vangard," Ferradji observed skeptically.

"Yes, how about that?" inquired Fenross. "You said that you were disabled by an electric shock."

"Ferradji is not aware of all his faculties," responded Kordistell. "In a moment of panic, he unwittingly delivered a heavy electric discharge through his hands. When he has been restored to full self-possession, he can use that ability at will. It paralyzed me with a complete magnetic nerve block. There were no facilities in the Census Squadron for giving me the necessary treatment, comparatively simple though it is, so I had to be sent back to my base of origin."

"In fact, my case wasn't correctly diagnosed until I returned to Earth. The commander of the Census Squadron reported that I had suffered a spontaneous seizure, nature unknown. It never occurred to anyone to suspect Inconido, the eccentric vagabond."

"And, speaking of latent faculties, Ferradji, when were you first troubled by your mysterious voices and music?"

"When? Well—I would say—about the time that the Census Squadron arrived on Vangard."

"I surmised as much. Don't worry about it. As an unintentional by-product of our peculiar metallic physiology, we are receptive to broadcasts by either radio or stereo. The Vangardifs haven't even thought of either one, as yet. After the Census ships arrived, you began to hear things—intermittently. With the faculty under conscious control, you may tune in or out, as you choose."

"There's a transport waiting outside. In half an hour you can be in the hands of my personal staff, and this disagreeable interlude in your career will be ended."

"But we don't look alike," expostulated Ferradji. "I could pass as a dark-skinned individual of normal antecedents, but you—"

"You are dark—with a slight patina, my dear fellow," retorted Kordistell. "We were made at different times, on different worlds. There are, all told, only five of us in existence. Our creation is not a task to be lightly undertaken. Both of us are predominantly steel and copper. It happens that you are provided with an epidermis of bronze, while mine is an alloy of silver and chromium—a mere variation in design."

"Very well," consented Ferradji. "I am totally nonplused, so I rely on your better judgment."

At a word from Evandene, the cavern illumination waned to moonlight intensity as the group moved toward the entrance. When they arrived at the archway, Ferradji spoke suddenly to Kordistell.

"That dinner invitation—it was a trick question!"

"So it was. I wasn't quite sure of your identity, but a truthful answer would have been conclusive. I didn't expect such a violent reaction."

"Now may I ask what all this is about?" inquired Evandene. "Ferradji hinted at something monstrous, some terrible thing that was all but unmentionable—"

"Ferradji's horrible secret?" added Kordistell. Then, to Ferradji, "Shall I tell them?"

"You may as well," assented Ferradji.

"Among the many forms of human bondage there are few so truly inescapable as the tyranny of the alimentary canal," Kordistell apparently quoted from an unspecified source. "Ferradji and I are practically free of that bondage. With very little preparation and no ceremony we take our daily ration of pulverized metals, and selective assimilation takes care of the isotope separations. You know all this, but Ferradji didn't. He observed that the Vangardifs behaved otherwise, that they differed in other respects, and concluded that he was something horrible. He suffered mental torment in secret, quite unnecessarily."

"My grinding wheel!" exclaimed Ferradji, and turned to retrace his steps.

"Leave it; let the counselors keep it as a souvenir," advised his companion.

As they crossed the pergola, the air shuddered anew with the vibrations of power from the elongated dark shape of the hovering air transport. A parabolic beam of white effulgence smote down from the vessel to the pergola steps. Ferradji, in reluctant acquiescence to Kordistell's urgings, entered into the radiance and was drawn smoothly upward.

When Kordistell in turn had stepped into the beam and had started to ascend, Fenross voiced a thought anent an unresolved mystery.

"It would be interesting to know just what happened to blackout Ferradji's memory on Vangard."

Kordistell motioned to the unseen operator of the beam, and hung suspended in a haze of actinic splendor.

"I have a theory about that," he called down to the counselors. "According to Ferradji, he was touching the standard of an arc light, after a rain. Now the Vangardifs are less than mediocre electricians. In my opinion, this case should go on record as 'Amnesia resulting from short circuit caused by defective insulation.'"

THE END.



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## DETECTIVE STORY

ON SALE AT ALL NEWSSTANDS

# THE LONG-TAILED HUNS

By L. Sprague de Camp

● First of a two-part article concerning the wild animals so  
sly that they can invade man's own fortresses—the cities.

Illustrated by Orban

Richard Farnsworth strode into Professor Glomp's office, his muscular chest preceding him like Cyrano de Bergerac's nose. The room reverberated to his calm, deep voice as he cried: "Professor, the expedition to the planet Aaa was an unqualified success, wasn't it?"

"Hm-m-m," said Professor Glomp. "What's this I hear about your falling in love again?"

Farnsworth blushed. "I thought we'd kept it a secret."

"Who's 'we'?"

"Miss Discounte and I."

"Is that the daughter of Amos Discounte, the interplanetary financier?"

"Uh-huh."

Glomp shook his head. "I don't know how you do it. Every time you return from an expedition, you inform me that you've fallen for the daughter either of a exploratory scientist of an interplanetary financier. When I was an intrepid young explorer, bankers' daughters didn't grow on trees. Wish you'd make up your mind and marry one of them. But why this Discounte female? I went over your films while you were in the hospital, and she impresses me as having no more brains than a Martian kfug-kfug. And she's not at all good-looking."

Farnsworth said plaintively: "After all, doc, there are only so many interplanetary financiers and scientists. Of these about a dozen have attractive unmarried daughters, and I've already been in love with all of those girls. But how about the expedition? Success?"

Glomp tugged his beard. "I don't want to hurt your feelings, Richard, but it was not so hot."

"What do you mean? Haven't I got pictures, records, and observations on the deadly pyrethrum, the man-eating astralagus, and the giant syntax?"

"Sure. Pictures of you shooting a four-eyed sukiyaki, and rescuing Miss Discounte from a razor-billed hacqueton. So what? They've been described and captured and photographed and dis-

sected ad nauseam. All you've done is blunder around where better scientists have preceded you, and get us in trouble with the conservation people for shooting a red-nosed allopath. I wanted you to get something *new*."

"Such as? I covered the jungle, the mountains, and the desert pretty thoroughly."

"Oh, Lord, how should I know? The man on the spot— What's that?"

"That" stuck a reptilian head out of Farnsworth's pocket and said: "Gwok!"

Farnsworth took the thing out of his pocket. It was something like a snake with a row of lizard legs arranged centipedewise along each side. Farnsworth explained: "They call 'em gwoks in Aaa. They infest the houses and steal the bread right out of the bread boxes. Smart little devils."

Glomp's eyes lighted. "Yes? Are there any more pests like this in the city you made your headquarters?"

"Oh, sure. There's a little octopuslike thing that lives in the water pipes, and raises the devil with the plumbing by dissolving its way through the valves. There's a bug that loves the ink on bank notes, and is so flat it can force its way through the cracks around the doors of safes to get at the money. And there's a vampire bird with a glass-cutting apparatus in its schnozzle, for getting through windows—"

Glomp bounced with excitement. "These are all new! None of the previous explorers of Aaa mention them except incidentally as pests! Where are your specimens? Your observations on diets, life cycles, and so on?"

Farnsworth shrugged. "This little gwok is the only one I brought back. I hardly thought you'd be interested in a lot of little vermin, so I didn't make any observations on them. Anyway, they're confined to the cities, and I was off in the jungle most of the time rescuing Miss Discounte—"

"What?" screamed Glomp. "A whole new life-zone right under your nose, and you ignored it?"



He began frenziedly throwing department of agriculture bulletins at Farnsworth. "GET OUT!"

When the storm had subsided, Farnsworth asked, as he usually did: "I'm sorry, sir, really and truly I am. Won't you explain—"

Glomp mopped his forehead. "I suppose it's too much to expect you to be an intrepid hero and an intelligent investigator at the same time. But I'll tell you a little story, which may give you some idea of why I'm interested in your 'vermin.'

"As you ought to know, but probably don't, during the first half of the fifth century A. D., Europe was invaded by a great migration of Turkish and Mongol tribes from the steppes of central Asia, who had been forced out by one of the periodical dessications of their grazing lands. The Europeans called all these invaders Huns, though they were a pretty mixed lot to begin with and became more so as they picked up other peoples in their migrations: Alans from the Volga, Goths and Slavs from southern Russia, and so on.

"One of the Hunnish kings, a wily politician named Attila, assembled an empire stretching from the Rhine to central Asia. But after Attila's death none of his sons could hold the empire together, and soon things were back pretty much as they

had been. The Huns either went back to the steppes to herd sheep, or settled down and mixed with the native Europeans. These Huns, by the way, had no tails.

"But that was not the only Asiatic invasion suffered by Europe. One race of small folk had moved in several centuries before and made themselves at home. We're not sure what part of Asia they came from.

"Another, a race of larger, darker people, migrated from India to southwest Asia. When the Crusaders' ships returned from Palestine in the twelfth and thirteenth centuries, these people stowed away and came to Europe, which they completely overran in short order.

"And a third such Hunnish invasion took place in the years immediately following 1700. The invaders came from a couple of small, arid areas near the Caspian Sea and Lake Baikal. They swarmed across Russia and all over Europe, where in most places they drove out the dark folk from India. And in Europe they remain to this day, despite all efforts on the part of the Europeans to oust them.

"These three races of Huns differed from Attila's sheepskin-clad horsemen in two respects: They did not intermarry with the native Euro-

peans, and they had long tails. They were, in order of arrival, the house mouse, the black rat, and the brown rat."

All of which, my friends, is a rather lengthy introduction to an article on the newest life-zone: the urban.

When we survey the life-zones of our planet, we list the equatorial rain-forest belt, the intertidal zone, the pelagic zone of the surfaces of the oceans, et cetera. We are apt to think of towns and cities as something outside of the natural life-zones; a nonlife-zone, as it were, barren of life except for man and his animal pets and slaves. When our vacations come we go to the "country" and keep an eye open for such "wild" life as has not been exterminated by our fellow men.

But, however more varied and picturesque the wild fauna of the country may be than that of the city, the human city is still an environment capable of supporting wild life—just as the cities of ants and termites harbor uninvited guests, beetles, silver fish, spiders, et cetera, which prey on their hosts or live by stealing, scavenging, or panhandling, exactly as most of the animals of the urban life-zone do.

An example of the first method is: In human cities the bedbug, *Cimex lectularis*, preys on the builders of these cities. For the benefit of those who have never suffered from its visitation, it is an active, disk-shaped insect that hides in cracks in the woodwork during the day, and at night prowls abroad looking for sleeping human beings to "bite." I use quotes because *Cimex* really does something for which there is no good, exact word in English: it pierces the skin with its jawless proboscis and sucks the blood of its victim, just the way a mosquito does. Like most of the truly urban fauna, it is cosmopolitan in distribution; that is, found the world over, except in tropical Africa and India where it is replaced by the tropical bedbug, *C. hemiptera*. *Cimex* is a true bug: a member of the Hemiptera, not merely a bug in the broad American sense of any small land arthropod.

*Cimex* not only bites; he stinks, and he carries relapsing fever. He had no known virtues, using "virtues" in the special sense of "qualities helpful to mankind." (People still judge animals on that basis, though why the animal kingdom should want to help mankind, after all that mankind has done to the animal kingdom, I can't imagine.) *Cimex* is thus a hard problem for those theologians who used to assert—maybe they still do—that all other forms of life were created for man's benefit.

Examples of scavengers and thieves in our cities are the rats and mice mentioned above. Most animals of these habits will scavenge or steal, whichever is the more expedient. The animal can hardly

be expected to know whether a given edible is human refuse or something of which people still hope to make use.

We also have our panhandlers, mainly the park pigeon and the gray squirrel. Other species will readily take to this mode of life if encouraged. If your house is in the path of the annual migrations of wild ducks, it is an easy thing with a pool and some live decoys to persuade the ducks to drop in for a handout on their journeys.

The Bronx Zoological Park acquired something of a problem in this way: the wild ducks found that they could pick up a meal by stopping off for a day or two with their tame relatives in the duck pond. Eventually many of them took to spending the whole winter there, eating the vast quantities of grain that the Zoo people have to furnish to keep their own ducks from being eaten out of house and home by the so-called transients, who regularly consume about fifteen tons of cracked corn every winter. I have heard of human relatives who behaved in a similar manner.

Moreover the wild ducks quickly learn where they are safe from molestation. In the Bronx Zoo the blacks, mallards, baldpates, pintails, and Canada geese, who during January may outnumber the tame ducks three or four to one, and who in Currituck Sound will not knowingly let a man approach within half a mile, pursue their quacking ways completely indifferent to the Zoo visitors a few feet away.

The wild life of the urban life-zone shows all degrees of adaptation to the environment, just as the inhabitants of the other life-zones do. Some species are tied almost exclusively to man-made structures. The brown rat is a good example; it is almost never found living wild in a truly "wild" environment, except in those two small areas in the deserts of central Asia. Its limited "wild" distribution suggests that it was a dwindling species that might very well have become extinct if some enterprising rats had not invaded human habitations and found themselves ideally adapted to a steal-and-scavenge life there. Now there are probably more brown rats than there are people.

The gray squirrel, on the other hand, *Sciurus carolinensis*, is fairly successful in a "wild" environment as well as in city parks. However, there is reason to believe that its small but fierce cousin, the red squirrel, *S. hudsonicus*, drives it out of areas where the ranges of the two species overlap, both by besting it in combat and by monopolizing its food supplies. It is conceivable that over a long-enough period the gray squirrel might become extinct in the wilds, surviving only as an urban panhandler. The gray squirrel was introduced into Great Britain, where it has reduced the numbers of the British squirrels. Heaven help the



British squirrels if the red squirrel ever gets a foothold in England!

I am not considering parasites such as lice and tapeworm, who spend most of their lives on or in one host: their environments are human scalps and intestines rather than cities as such. Nor am I taking into account the truly domestic animals, which cannot be considered "wild life" by any standard, and most of which could not maintain themselves for any length of time either in the city or the wilds without human help.

The one partial exception in American cities is the cat, which may run wild both in the city and the country. In the city, feral cats live by scavenging from garbage pails and by preying on other urban fauna: rodents, sparrows, and cockroaches. The city of Lisbon swarms with such felines.

As with most domestic animals, the origin of the cat is a debatable question. There is nothing exactly like *Felis catus* anywhere in the form of a native wild animal. There are a number of small Asiatic and African wild cats, all of which have probably contributed to the present stock of domestic cats. Among these are the North African wild cat; *F. ocreata*; the European wild cat, *F. silvestris*, which contributed the brindled tabby-cat coloring; Pallas' cat, *F. manul*, of Tibet, which has circular eye pupils and which gave the Persians and Angoras their long hair; the Indian jungle cat, *F. chaus*, and a few others.

But, by and large, *F. catus* becomes feral from compulsion, not from choice. Cats like to eat regularly just like anybody else, and most "wild" cats are only too eager to adopt any person who shows an inclination to furnish the all-important meals.

There are also animals that associate with or live off man, but not in cities. The coyote is a good example. The timber wolf has practically been wiped out in the United States, to the sadness of naturalists and the fiendish glee of sheepmen. But its wily little cousin not only has not disappeared as cultivation and exploitation of the continent advanced; it has actually extended its range, and within recent years has spread to Alaska and to western New York State.

The coyote, though smaller than the timber wolf, is obviously too big to get along in the urban life-zone without human toleration. He is too good a target; he is too big to slip into small holes; he requires too much food.

Since man invented weapons with which he can kill any land animal with ease if he can get a good shot at it, no large animal can run wild in a city without man's permission. In Europe and America this permission has not been forthcoming for any animals larger than the cat and the pigeon. Though many wild animals readily become tame

or nearly so, not one of them makes a really reliable pet,\* and the larger ones are dangerous because of their size alone. It would not do to have even the friendliest moose running loose in a modern American city, stepping on people and tying up traffic.

In Asia, man's faunal tolerance is wider. The cities of India are notoriously infested with panhandling cows and thieving langurs, monkeys of the genus *Simnopithecus*. Asiatic cities also harbor swarms of half-wild scavenging dogs. The cows and monkeys owe their immunity to the fact that they are sacred, and the dogs constitute the urban departments of garbage disposal. The long-haired mastiffs of Tibet and Mongolia are the official morticians of those countries, and when these formidable beasts are hungry enough, they do not mind eating a live man who is so incautious as to relax in their neighborhood.

Perhaps the quaintest panhandlers are the sacred deer of Nara, Japan. They roam the city, curling up on the sidewalks to sleep. When a tourist buys rice cakes to feed them—Japanese are sentimental about such things—the deer swarm around him in droves, halting traffic, pushing and butting the smaller deer out of the way, stepping on the tourist's toes, and, when he runs out of cakes, expressing their chagrin by giving him a stiff prod from behind. (I was once such a proddee.)

So far we have considered only land animals. But the urban environment includes a great volume of fresh or slightly brackish water in its reservoirs, pipes, and sewers, with their own fauna and flora. Most unwanted life-forms can be kept out of the water system by chemical or mechanical means, though a few hardy water-things get in despite filters and chlorinators.

Eels reach the cities of the Atlantic coast after their migration from their hatching place in the Sargasso Sea while still little wigglers; they get into the water systems in spite of everything, so that New York, for instance, harbors a fair-sized eel population. The domestic water pipes of Westchester County have been invaded by fish-fry, to the surprise of the people out of whose faucets they popped.

When a city uses unfiltered water, its mains and pipes become a veritable aquarium. The most notorious case is that of Hamburg in the last century. Hamburg used unfiltered water from the Elbe, and its system swarmed with sponges, polyps, annelids, flatworms, roundworms, mollusks, shrimps, hordes of slaters (fresh-water crustaceans resembling sow-bugs), sticklebacks, eels, and others. It took a cholera epidemic that killed eight thousand peo-

\*A great-grandfather of mine was almost killed by a supposedly tame whitetail buck. The incident is described in fictional form in Walter Edmonds' novel "The Big Barn."



All-conquering invader—

ple to convince the Hamburgers of the need for municipal filters. Some of those who live in Philadelphia assert that something of the sort is likely to happen to that city one of these days.

The species of this water-system life are all found in the aquatic "wilds," so they should be classed as occasional invaders like the Bronx Zoo's ducks, or—in the case of the ubiquitous eels—as urban members of primarily nonurban species like the gray squirrel. For wild life that is *primarily* urban, only occasionally invading the country, we have to confine ourselves to land animals. In this category we find mammals, birds, insects, and arachnids.

The dominant mammals are, of course, our long-

tailed Huns. The first of these, the timid and prolific little house mouse, was already established in Europe in classical times, wherefore there were words for it in classical Latin and Greek: *mus*, *mys*. (There were none for "rat.") *Mus musculus* has no exact wilds equivalent in the Old World, though he has invaded the country with considerable success in America since his introduction there, and though there are several closely related old-world wilds-mice—not just wild mice, but wild mice living in the wilds. Among these are the little *M. spicilegus* of Europe and several Asiatic species. *M. musculus* cannot compete directly with the bigger, tougher, and cleverer rats, but he gets along by virtue of his very smallness in places where the rats cannot.

The black rat, *Rattus rattus*, is a native of India as Professor Glomp explained. The terms "black rat" and "brown rat" are unfortunate because the "black" rat has a brown phase and the "brown" rat a black phase. The black rat can be recognized regardless of coloring by his long tail, slender build, pointed muzzle, and large, hairless ears. He is, in fact, very much like an enlarged mouse. He seems to have been brown originally, and he still is prevalently brown or brownish-gray in southern Europe and northern Africa. The original wilds races of India and Burma have white bellies, and black rats that have gone back to wilds life in southern Europe have reverted to this primitive coloring. The black phase developed in the colder parts of Europe between the Crusades that first brought them and the year 1530 when they were first scientifically described.

The stowaway black rats brought not only themselves and their voracious appetites to Europe; they brought the Black Death—the bubonic plague that ravaged Europe in the Fourteenth Century, and which in England resulted in the emancipation of the working class—as a consequence of the scarcity of labor—and the accumulation of lands falling to the Church, which eventually provoked Henry VIII to confiscate Church lands. The black rat, while perhaps less destructive than his brown competitor, is an even more active agent in the spread of plague, as he leads a more roving life and harbors the Oriental plague flea, *Xenopsylla cheopis*, which carries plague indiscriminately from rat to rat, rat to man, man to man, and man to rat. In fairness to the rats and fleas, it should be mentioned that the plague is just as deadly to them as it is to men.

The black rat is an agile climber, as a result of which he is *the* ship rat. As long as plague exists there is the danger of its being carried to any part of the world by ship rats. A method of keeping rats on ships from Asiatic ports from jumping ship in other parts of the world is to put large

metal disks on the mooring hawsers, down which the rats would otherwise travel.

The black rat had enjoyed his exploitation of Europe only about four centuries when he was rudely ousted by the brown terror from central Asia, *Rattus norvegicus*, a stout, short-tailed, blunt-headed rat with small, hairy ears. Within the last three centuries the brown rat has spread all over the world. He has driven out the black rat everywhere except in ports, where the Rat International of ship rats supplies reinforcements, and in India, where the black rat is still the standard house rat. The brown rat is not only heavier and more pugnacious than the black, but more prolific, bearing a maximum of twenty-three to a litter compared with the black's eleven. In cold latitudes the brown rat has developed a black phase, just as the black rat had done before it.

The brown rat is an expert burrower, swimmer, and diver. It is intelligent, wary, fierce, inquisitive, gregarious, and omnivorous. The more we study *R. norvegicus* the more he reminds us of people. When well-fed he is friendly and easily tamed; when starved he displays astonishing courage, ferocity, and ingenuity in getting food. He can steal the eggs from under a sitting hen without her knowledge. When some raty tenement houses in England were demolished, the rats moved into a nearby restaurant. They took to leaping on tables, grabbing whatever was loose, and scooting off before the horrified customers could protest. And under special circumstances they have killed and eaten full-grown, active, fully awake men.

Like human city dwellers, the brown rat likes to camp out in the wilds for short periods in good weather; but he always returns to the dwellings of man. And he likes to kill frogs and toads, which he does not normally eat, purely for sport. He gnaws holes through walls and embankments, sets fire to houses by chewing matches, perforates gas mains and water pipes, eats and ruins immense amounts of human food, mutilates and kills domestic animals, exterminates the native fauna and flora of islands to which he is introduced, attacks babies in their carriages, eats the faces off soldiers wounded or exhausted in the field, transmits bubonic and pneumonic plague, spreads trichinosis, spirochetel jaundice, and equine influenza, and, if you pick him up while there is any life in his tough little body, sinks his chisel teeth into you and gives you rat-bite fever. His only "virtues" are that he keeps down mice—a case of the cure's being worse than the disease—and makes a splendid subject for scientific culture and experimentation.

His—or her—period of gestation is only three or four weeks. The birth of the young is immediately followed by a period of heat on the part of

the female, so that the next litter is started before the first is weaned. Like people, they breed the year round.

The rat's human characteristics run all through the fauna of the urban life-zone. Most of the specifically urban life-forms display, compared with their relatives, adaptability, a highly organized nervous system, a great tolerance of diet, and a general psychic toughness that enables them to live and breed in this noisy, competitive, "unnatural" environment of brick, timber, steel, concrete, and asphalt. Even the lowly bedbug is a pretty active and resourceful bug as hemipterids go.

A fine example of these "human" qualities is afforded by that ubiquitous, impudent, and unlovely little Cockney, the house—"English"—sparrow, *Passer domesticus*. This bird got its start in America as a result of the Great Sparrow Craze of the 1870s. A number of otherwise sane Americans spent hundreds of dollars importing house sparrows from Europe. They coddled them, released them in American cities, built thousands of birdhouses to shelter them, and gave them hundreds of barrels of feed.

The Brooklyn Institute started the witless performance with the importation of eight pairs in 1850. These did not live, but in 1853 the Institute brought in some more. From then to 1881 house sparrows were released in at least fifteen cities, including New York, Boston, Philadelphia, Galveston, Iowa City, and Salt Lake City. A Captain William Rhodes of Quebec planted them in Portland, Maine. When they became common they were transplanted from these cities to others; in 1871-1872 several hundred were taken from New York to Indianapolis.

This apparently insane antic was carried out with the object of giving American cities a dear, quaint, Old-World atmosphere, and also under the mistaken impression that the house sparrow would keep down insects. One of its few effective enemies is the northern shrike, *Lanius borealis*, which is called a butcher-bird from its habit of impaling its prey on thorns and the barbs of wire fences. But when the shrikes became so common in Boston that they threatened to exterminate the sparrows, the Boston authorities hired a man to prowl the Common shooting shrikes!

The Boston authorities might as well have saved their money; the house sparrow soon became so common that it drove out of the cities such native birds as the tree swallow, which had begun to take up urban life. The sparrows multiplied to millions and overflowed into agricultural areas, though they still prefer cities and are hardly ever to be found in genuine wilds. The numerous horses used in cities at that time furnished the

sparrows with plenty of their favorite food of half-digested oat grains.

Then it was discovered that the sparrows were only mildly interested in keeping down insects—something the ornithologists could have told the sparrow enthusiasts all along—that they ate grapes and other fruits and vegetables; that they attacked the blossoms and buds of fruit trees; that they molested native birds such as the bluebird, the purple martin, and the house wren, driving them out of the birdhouses provided for them by bird lovers; finally that their song was no more than primitive repetition of the call note: a series of harsh, unmusical chirps.

Accordingly the laws that had been passed protecting sparrows were repealed. Bounties were put on the birds, and efforts were made during the '80s to exterminate them. That did not prove anywhere near as easy as introducing them. Large-scale shooting and poisoning are impractical in cities; the sparrows learn to avoid traps, just as rats do; and such alert and agile birds seldom fall victim to cats and hawks. Efforts to control the sparrows got precisely nowhere.

With the decline in the use of horses in our large cities, the sparrow population may have decreased. At least in New York as this is written the sparrows, while not rare, do not seem to occur in the immense chattering flocks that were complained of so bitterly around the turn of the century. Perhaps, if cities came to be built entirely of modernistic houses of severely plain design, the sparrows would die out for lack of places to nest. But in the meantime the Gothic foofaraw on the Woolworth Building, for instance, provides nest places for plenty of sparrows. And the City of the Future is usually represented as having long lanes of trees, which the adaptable sparrows use as readily as they do fancy cornices.

Concerning the sparrows' song or lack thereof, an ornithologist named Townsend noted that sparrows reared with birds of other species adopt the songs of the latter. Dr. Townsend proposed that a certain number of sparrows be educated in this manner, and then released to act as missionaries to their cacophonous brethren. As far as I know, Dr. Townsend's idea has never been tried out.

The male house sparrow would be an almost handsome bird if his sober gray-and-brown coat were not dingy with a thick coating of soot. The sparrow has a big, strong bill for a bird of his size, and he uses it with murderous efficiency on any unfortunate swallow or wren that disputes his choice of nesting site. He does not scratch with his strong feet, but he has learned to use his tail as a prop in climbing, like a woodpecker. He is a belligerent extravert. A pair of males will fight over a lady-love almost under the feet of pedestrians. If some kindly passer-by tries to separate

the combatants, they fly off, swearing furiously, to renew the battle elsewhere.

House sparrows produce five or six broods a year. The female lays four to seven eggs, which hatch in two weeks. The young sparrows are rather gruesome little naked things. They must be attractive to their parents, who display strong parental instincts and will feed a chick after it has fallen out of the nest, as many birds will not.

*P. domesticus* has admittedly almost no "virtues" from our point of view. We cannot condemn him too severely, though, without by implication condemning ourselves, for he is, perhaps, the most "human" of all birds.

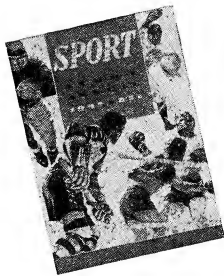
As if the example of the house sparrow were not sufficient, about 1890 someone brought over to New York City the common European starling *Sturnus vulgaris*. This bird used to nest in reed beds, but comparatively recently has become a city slicker. In some American cities it is now a worse pest than the house sparrow. In 1933 the department of trees and parking of the District of Columbia undertook to rid the national capitol of the thousands of starlings that infested it.

First they tried stink pots, but these proved harder on the congressmen than on the starlings. Then they collected a bunch of CWA employees and gave them long poles to whose ends were hung tin cans with pebbles in them. They were supposed to rattle the cans about the eaves and thereby to rattle the starlings into leaving. The starlings just jeered. Finally the bird frighteners were given balloons on the ends of strings. The balloons were to be allowed to bob about on a level with the starlings' roosts, with the object of giving the starlings coniction fits or at least anxiety neuroses. Perhaps the department of trees and parking neglected to paint fierce faces on the balloons, but at last reports the starlings were holding out as insolently as ever.

The starling is a more decorative bird than the house sparrow: larger, and glossy black. To make up for that he is even noisier. Starlings and sparrows between them have made the amiable custom of putting up birdhouses rather pointless; you have to stand guard over your birdhouse with a shotgun to keep the starlings or sparrows from getting in first, or, if they don't, from pitching out whatever other bird did.

The third city bird, that champion panhandler the park pigeon, is a very different sort of creature. He is a feral mongrel descendant of the various breeds of domestic pigeon, which in turn is derived from the wild blue rock dove, *Columba livia*, of Europe, Africa, and Asia. In its primary wild state the rock dove lives mainly on seeds and snails. Though a powerful flier, it is a friendly,

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easily tamed bird,\* which qualities may account for its being probably the first of all birds to be domesticated.

Domestic pigeons have been modified into a number of breeds selected for speed, strength of the homing instinct, or some bodily deformity. Curiously the largest breeds are called *runts*. The feral park pigeon has reverted to a form and coloring much like that of his wild ancestor, just as the dog produced by crossing enough different breeds is a prick-eared, curly-tailed, yellow-haired mongrel very much like the wild but fairly domesticable Australian dingo.

The park pigeon is found in most of the world's large cities, the pigeons of Venice, Italy, being famous. Many people are charmed into feeding it popcorn by the handsome green-and-purple iridescence of its neck feathers, by the bird's general air of benign imbecility, and by memories of its association with religious myths. The use of the pigeon to symbolize peace is not really appropriate. It is quite as quarrelsome and pugnacious as its feeble armament permits.

Besides man's remarkable tolerance of this bird in the face of its continuous befouling of public

\*Any bird tends to appear rather foolish to an intelligent mammal. The bird-type of evolution is based on an entirely different system of organization, more a blend of insect and mammalian. That is, a bird can learn some things—an accomplishment beyond an individual insect. But a bird is born "knowing" most of the rudiments of its life methods—how to catch its particular prey, how to build its particular type of nest, et cetera. It shares with the insect forms the method of life based on inherited "knowledge" of what and how to do things.

The mammalian form of life, in evolving, tried a completely different path to successful living. A mammal is born with a remarkably complete lack of understanding. No other high form of life is so startlingly witless as a new-born mammal. The mammalian method is to make each individual learn everything from scratch. The system is effective, but annoying; I'd have liked it better if I'd been born with a complete education. The necessity to learn everything about the facts and acts of life, however, forced mammals to evolve a brain capable of rapid learning. Result: because birds and many other types of life don't have to learn rapidly, they can't, and they seem remarkably stupid to a mammal.

monuments, it owes its survival in cities partly to the fact that it is a light eater for a bird of its size, and partly to the fact that it is strictly a bird of one idea.

That idea is the one for which rabbits, guinea pigs, and to some extent cats are notorious. The sexes are pretty similar, and the male pigeon, though like most birds he has seen eyes, lacks the wit to tell a male from a female. Hence he propositions every other pigeon he meets. His persistent erotomania gives the species a tremendous potential rate of expansion, despite the fact that the female lays but two eggs at a time. Before a given pair of squabs have become independent, their mother will have laid her next pair of eggs. Not only will a well-fed pair of pigeons produce twelve broods a year, but the young become sexually mature at eight months.

So, I am not at all worried for the fate of the species when I learn that a pair of hawks have moved into Saks' Fifth Avenue store, or the towers of the Brooklyn Bridge, and are eating the pigeons as they do now and then. If sentiment prevents people from making these feathered loafers and Don Juans into pies, there is no reason why they should go altogether to waste.

Mating customs among pigeons are comparable to those of human beings: theoretically they are monogamous and mate for life; actually infidelity is frequent, and polygamy and homosexuality are not unknown. The nest-building instinct in pigeons is vestigial. The male will fetch a string or the equivalent, and parade around a cornice or window sill with it as if he actually intended to build a nest. Then he and his mate quietly drop the whole matter and deposit the eggs on the bare stone.

#### TO BE CONCLUDED.

## IN TIMES TO COME

Oddly, with this first of the large-sized issues, the departments are unusually crowded this month. Part of the reason for that is the lessened flexibility inherent in the use of long stories. Next month I hope to expand Brass Tacks and these other departments to fuller size.

And next month's issue brings the conclusion of E. E. Smith's latest Gray Lensman serial, as you know. You know that story—and won't want to miss that issue for that reason alone. But another reason for making certain of it, an equally good reason, is C. L. Moore's "There Shall Be

Darkness." It's unfortunate that Miss Moore is a long-interval writer—we'd all like more of her fine material. "There Shall Be Darkness" is, like most of hers, dependent more on the mood—the feeling of tragedy—that hangs over it than on its plot, strong though that is.

Briefly, it's about the last detachment of the Terrestrial Empire's troops on Venus. They're being called home, back to the failing, dying heart of the Empire that's going down into the last long darkness—

*The Editor.*



## BRASS TACKS

*Since momentum and energy are directly related, the explanation on either basis is correct.*

Dear Mr. Campbell:

I've been wondering if Malcolm Jameson gave much thought to his "unbeatable" gambling machine in "You Can't Win." The machine has mechanical flaws which can't be remedied and can be beaten without taking advantage of them. The most obvious is that the curve of the bowl will bring both balls to the lip of the hole at the same time. The ball that is traveling faster will at this point pass the other and will be completely clear of the lip and falling freely before the other ball is. On second thought, there is a way to fix this. The surface of the gong could be such that the ball which is carried farther by its momentum will have to fall farther before it strikes the gong.

The game can be beaten by placing the balls in contact with each other and lined up with the hole. The second ball could never pass the one below it. Another method would be to have a heavy ball released high on the side of the bowl strike a glancing blow against a light, slow-moving ball.

If the house rules against contact between the balls, we must depend on the properties of the inverted cycloid. The equation for this curve—neglecting the hole in the bottom—is  $x = a \operatorname{arccos} \frac{y}{a} + \sqrt{2ay - y^2}$  with the depth of the bowl being  $2a$ . This curve is symmetrical with respect to the  $y$  axis, which places the center of the bowl at origin. Differentiating the equation we confirm the logical supposition that this center is horizontal. Since the curve of a tautochrone must be extended to its finish point—the center in this case—in order to function, it is apparent that the hole is not cut into the cycloid, but that the curve is

split at the center and drawn apart to provide for the hole. This means that at the lip of the hole, the curve is horizontal. This cannot be changed without destroying the tautochrone. A ball, placed just on the edge of the hole will not roll in and, therefore, will be beaten by any other ball.

If the coefficient of friction of the bowl is as low as is claimed, the balls would slide down instead of rolling. The method of beating the game mentioned in the story would not work.

Incidentally, while this method would work if the balls rolled, it was not explained correctly. The question was not one of energy used for translation and rotation. Any rotation of a ball would produce translation and vice versa. The essential point is that since the mass of the slow ball was concentrated farther from the center than was that of the fast ball, its radius of gyration was greater. Since for a given mass, the greater the radius of gyration, the greater the moment of inertia, it follows that the moment of inertia was greater in the slow ball. This is the measure of resistance to rotation. It slowed down the ball in the same manner as a brake, resisting the rotary motion of a wheel, slows down the translatory motion of a car.

I have a word for the authors—and editors—who prophesy interstellar flight as a result of atomic power. How are you going to apply atomic power as a propellant? And since in a free system—a ship in space—the momentum is constant, to change the velocity of the ship, part of the system must be thrown off in a direction opposite to that in which it is desired to travel. The momentum of what is thrown off will equal the momentum of what is left. Momentum is proportional to mass. What mass will you throw off to acquire the momentum—proportional to velocity—necessary for interstellar or even interplanetary flight?

About the cover. I cannot picture behind that apelike face, bushy brows and receding forehead the profound intellect of one Kimball Kinnison.—Raymond Vachss, 2847 Webb Avenue, Bronx, New York, N. Y.

*Well, how about that large size, now you've seen it?*

Dear Mr. Campbell:

Having just read the November issue of Astounding, here goes my monthly comments:

The best story of the issue was—yeah, I know you've guessed it—E. E. Smith's "Second Stage Lensmen." Probably you will receive many letters saying that Smith has gone too far, the story is just too super super. Well, Dr. Smith is the only author in the stf field that writes that type of yarn and one every two years is really something to look forward to, so keep on printing a Smith epic whenever you can. The cover, although not as great as Rogers' "Grey Lensman" artistry, was nevertheless one of the artist's best.

While I'm on the subject of covers I'd like to say I'm heartily against going "large size" if it means losing the cover—à la *Unknown Worlds*.

Second place goes to Nat Schachner and his "Beyond All Weapons." A swell story written by a swell author. Glad to see Charles Schneeman back. Is he available to do more art work for you yet?

The shorts rank in this order: 3. "Seat of Oblivion," 4. "The Door" (belonged in *Unknown*), 5. "You Can't Win," 6. "Direct Action," 7. "Finity." For the greater part the shorts were under par, with only Russell's outstanding.

And now for the inevitable art question. Hubert Rogers' interior illustrations are vastly improved, witness his latest for Smith. Kolliker still smells. Schneeman—grand. Kramer—lousy. The Isips are gone for good, I hope. Please get Finlay, Dold, and Wesso.—Vincent Scullin, care of John Shields, 2914 Twenty-ninth Street, Washington, D. C.

*Schneeman, being over twenty-eight, is now out of the army again.*

Dear Mr. Campbell:

Analytical Laboratory report—November, 1941 A S-F.

Cover: A color-print, candid-camera shot. As good as last October's. Rating: 100. Rogers is good!

Interior pix: Rogers' for SS Lensmen are good, even if some are warmed over. Average 90%. Schneeman's: 95%; Orban's 90%. The others are only so-so—except the face in the *Unknown Worlds* ad.

The story. Since you say it is not fair to rate the serials with the other stories, I will put SS Lensmen where it belongs—in a class by itself at the top. Of course it didn't get fully under way, but it *promises!* I get a kick out of his futuristic slang.

The other stories: I suppose everyone else will put Schachner's novelette in first place. I liked it, but— Well, after looking over the other stories, I will give it first. (1) "Beyond All Weapons"—rating 85%. (2) a tie between "You Can't Win" and "Direct Action." Both likely yarns—82%. And now, for the first time, I am going to show you really how low my scale of rating goes: (3) "Finity" 70%. (4) "Seat of Oblivion 60%. (5) "The Door" .0000001.

Haven't read the article yet, as I believe that field was covered in an article a few months back. Let's try for no duplication. The editorial was interesting. Oh, for a new story by Campbell or Merritt—and I mean a long one! Not enough new ideas and superexotic writing nowadays. But why beef when I've got a new Dr. Smith tale in front of me—almost?

I'll try to get out a 1941-Year An. Lab. Report after next month's issue.

Rating, November 1941 Astounding S-F—issue as a whole—about 90%. As you remember, my 100% standard issue was December 1934. If it had had today's set-up, covers and pix, it would rate 150, or more.—L. M. Jensen, Box 35, Cowley, Wyoming.

## ANALYTICAL LABORATORY

As mentioned in "In Times to Come" the departments are crowded this issue; hence the Laboratory is—fittingly—among the letters. The majority of the letters received this month rated the serial "Second Stage Lensmen" along with the complete stories, so that's in the Lab rating, too.

Place	Story	Author	Points
1.	Second Stage Lensmen	E. E. Smith, Ph. D.	1.8
2.	Beyond All Weapons	Nat Schachner	2.9
3.	You Can't Win	Malcolm Jameson	3.2
4.	Seat of Oblivion	Eric Frank Russell	3.8
5.	Direct Action	John Hawkins	4.3

*The Editor.*





# SECOND STAGE LENSMEN

By E. E. Smith, Ph. D.

● THIRD OF FOUR PARTS. Kinnison invades the Base planet of the Second Galaxy single-handed.

Illustrated by Rogers

## Synopsis

When the inertialess drive was perfected and commerce throughout the Galaxy became commonplace, crime became so rampant as to threaten Civilization. Then came into being the Galactic Patrol, an organization whose highest members, the Lensmen, are of unlimited authority and range. Each is identified by his Lens, a pseudoliving, telepathic jewel matched to the ego of its owner by the Arisians, a race of beings of unthinkable age and of im-

mense power of mind. The Lens cannot be counterfeited, since it glows with color when its owner wears it and kills any other who attempts to do so.

Of all the eighteen-year-olds of Earth, only about a hundred win through the five-year period of elimination and become Lensmen. Kimball Kinnison graduates Number One in his class and sets out to capture one of the new-type ships of the "pirates"—in reality Boskonians, adherents to a culture even more widely spread than Civilization. He

succeeds, but with Van Buskirk, a Valerian, is compelled to take to a lifeboat.

They land upon Velantia and aid Worsel, a scientist, in overcoming the Overlords, a horribly parasitic race of Delgon, a neighboring planet. En route to Earth they land upon Trengo, the planet upon which is produced thionite, the deadliest of all habit-forming drugs.

Kinnison seeks Grand Base, Boskone's military galactic headquarters. He is seriously wounded, and in Base Hospital is cared for by

Nurse Clarissa MacDougall. Surgeon General Lacy and Port Admiral Haynes promote a romance between nurse and Lensman. Kinnison goes to Arisia for advanced mental training, acquiring the sense of perception and the ability to control the minds of others. He investigates Grand Base, finding it impregnable to direct attack. He obtains a vast supply of thionite from Trecco. He breaks into Grand Base and floods its air with thionite, wiping out all the personnel except Helmut, the Boskonian commander. The Patrol attacks and Grand Base falls.

He discovers that Boskone's supreme command is in the Second Galaxy, and decides that the best way to get a line upon it is to work upward through the drug syndicate. Disguised as a dock wallop, he frequents the saloon of Bominger, the fat drug baron of the planet Radelix, and helps raid it. He calls a Conference of Scientists, which devises the means of building a bomb of negative matter. Strongheart, the next in line above Bominger, he investigates as Wild Bill Williams, of Aldebaran II, meteor miner; after having become a heavy drinker and a bentam eater. From Strongheart's mind he learns that his next objective is Crowninshield of Tressilia III, the operator of a very high-class pleasure palace.

Boskone forms an alliance with the Overlords of Delgon, and through a hyperspatial tube they attack the commerce of humanity. But Kinnison and the Dauntless, the Patrol's finest spaceship, go down the tube and blast out the installation.

In order to investigate Crowninshield logically, Wild Bill Williams strikes it rich in the meteor belts and becomes William Williams, Aldebaran gentleman—he having actually been a gentleman once. From Crowninshield he gets a line upon Jalte, one of the Galactic Directors, whose stronghold is in a star cluster just outside the First Galaxy. He goes there and learns that Jalte does take orders from Boskone; which is not a single entity, but a Council of Nine of the Eich, a monstrous race inhabiting Jarnevon.

He and Worsel go there on a scouting expedition. Kinnison gets into the stronghold, but is blinded and tortured. Worsel helps him escape and they get back to Prime Base. Kinnison's hands and feet have to be amputated; but Phillips, a Posenian surgeon who has finally finished his researches in neurology and hormones, causes new limbs and eyes to grow in place of the lost members.

Kinnison and Mac, now sector chief nurse, acknowledge their love, but know that the job comes first. The Patrol's Grand Fleet is assembled; and, with Kinnison in charge of Fleet Operations, invades the Second Galaxy. Jalte's planet is consumed by the bomb of negative matter, the enemy fleet is wiped out in combat in intergalactic space, and Jarnevon, Boskone's home planet, is crushed between two colliding planets.

From the continuation of inimical activities, it becomes evident that Jarnevon was not essential to the Boskonian culture, and Kinnison learns that a counterattack is to be made against Tellus by means of a hyperspatial tube. The attack is made. The invading fleet is destroyed, largely by the use of the "sunbeam," a concentration of all the energy of the Sun into one beam of force.

Kinnison follows a hot scent to Lyrane II, in Dunstan's Region, in a spiral arm of the Galaxy. It's people are matriarchs, who hate all men and all other beings except themselves. Although masters of the art of killing by mental force, they cannot kill Kinnison; and he takes Illona Potter, a Boskonian captive, away from their Chief Person, whom he nicknames "Helen of Troy."

He finds that the girl, originally from Aldebaran II, is not a hardened spy, but a lovable youngster and a source of very valuable information. Menjo Bleeko is the dictator of her planet, Lonabar—one unknown to Civilization's planetographers and, therefore, certainly a zwilnik planet. Illona is wearing "beads" which are in reality priceless gems—Lonabar's real jewels, which she describes, are unknown to man. Kinnison calls a million Lensmen en rapport. Only one of them all, Nadreck of Palain VII, a frigid-blooded poison breather, has ever seen any one of those strange gems. He promises to find the planet of those jewels, Lonabar, and map it.

Kinnison now has two hot spots; Lyrane II and Lonabar. No Lensman known can work Lyrane against the opposition of the matriarchs—hence Clarissa is made a Lensman and assigned to the task. He becomes Cartiff, a murderous, outwaded jeweler, to work Lonabar from the jewel angle. He challenges the authority of Menjo Bleeko, the dictator, and overcomes him. Before killing him, Kinnison reads his mind—discovering that it has been so operated upon that he knows nothing about Boskonian, not even concerning the expeditions he himself has sent

to Lyrane. Lyrane must be important, and Mac is there alone!

At Kinnison's call, Worsel, Trengonsee, and Nadreck join him upon Lyrane II. Clarissa has secured information from which it is deduced that a cavern of Overlords is located near the north pole of the planet.

## XII.

"But listen, Kim!" Clarissa protested. "What makes you all so sure that it's Overlords? There's nothing on my map there to prove— Why, it might be anything!"

"It might not, too," Kinnison stated. "Barring the contingency of the existence of a life form unknown to any one of the four of us and which operates exactly as the Overlords do operate, that hypothesis is the only one both necessary and sufficient to explain all the facts which you have plotted upon your chart. Think a minute—you know how they work. They tune in on some one mind, the stronger and more vital the better. The fact that the Lyranians have such powerful minds is undoubtedly one big reason why the Overlords are here. In that connection, it's a mystery to me how Helen has lived so long—all the persons who disappeared had high-powered minds, didn't they?"

She thought for a space. "Now that you mention it, I believe that they did; as far as I know, anyway."

"Thought so. That clinches it, if it needed any clinching. But to go on, they tune in and blank out the victim's mind completely, filling it with an overwhelming urge to rush directly to the cavern. How else can you explain the number of these disappearances; and above all, the fact that the great majority of those lines of yours point directly to that one spot? For your information, I will add that the ones that do not so point are probably observational errors—the person was seen before she

disappeared, instead of afterward."

"But that's so . . . so *evident*," she began. "Would they do anything—?"

"It wasn't evident to you at first, was it?" he countered. "And, evident or not, they always have worked that way; and, as far as anyone has been able to find out, they never have worked any other way. Quite probably, therefore, they can't. The Eich undoubtedly told them to lay off, just as they did before; but apparently they can't do that, either—permanently. This torturing and life eating of theirs seems to be a racial vice—like a drug habit, only worse. They can quit it for a while, but after about so long they simply have to go on another bender. Convinced?"

"Well—I, I suppose so," she admitted doubtfully, and Kinnison turned to the group at large.

"There is no doubt, I take it, as to what course of action we are to pursue in the matter of this cavern of Overlords?" he asked, superfluously.

There was none. The decision was unanimous and instant that it must be wiped out. The two great ships, the incomparable *Dauntless* and the camouflaged warship which had served Kinnison-Cartiff so well, lifted themselves into the stratosphere and headed north. The Lensmen did not want to advertise their presence and there was no great hurry, therefore both vessels had their thought screens out and both rode upon baffled jets.

Practically all of the crewmen of the *Dauntless* had seen Overlords in the substance; so far as is known they were the only human beings who had ever seen an Overlord and had lived to tell of it. Twenty-two of their former fellows had seen Overlords and had died. Kinnison, Worsel and Van Buskirk had slain Overlords in unscreened hand-to-hand combat in the fantastically incredible environment of a hyperspatial tube—that uncanny me-

dium in which man and monster could and did occupy the same space at the same time without being able to touch each other; in which the air or pseudoair is thick and viscous; in which the only substance common to both sets of dimensions and thus available for combat purposes is a synthetic material so treated and so saturated as to be of enormous mass and inertia.

It is easier to imagine, then, than to describe the emotion which seethed through the crew as the news flew around that the business next in order was the extirpation of a flock of Overlords.

"How about a couple or three nice duodec torpedoes, Kim, steered right down into the middle of that cavern and touched off—*powie!*—slick, don't you think?" Henderson insinuated.

"Aw, let's not, Kim!" protested Van Buskirk, who, as one of the three Overlord slayers, had been called into the control room. "This ain't going to be in a tube, Kim; it's in a cavern on a planet—made to order for ax work. Let me and the boys put on our screens and bash their ugly damn skulls in for 'em. How about it, huh?"

"Not duodec, Hen—not yet, anyway," Kinnison decided. "As for ax work, Bus—maybe, maybe not. Depends. We want to catch some of them alive, so as to get some information—but you and your boys will be good for that, too, so you might as well go and start getting them ready." He turned his thought to his snakish comrade in arms.

"What do you think, Worsel, is this hide-out of theirs heavily fortified, or just hidden?"

"Hidden, I would say from what I know of them—well hidden," the Velantian replied promptly. "Unless they have changed markedly; and, like you, I do not believe that a race so old can change that much. I could tune them in, as I have done before, but it might very

well do more harm than good."

"Certain to, I'm afraid," Kinnison knew as well as did Worsel that a Velantian was the tastiest dish which could be served up to any Overlord. Both knew also, however, the very real mental ability of the foe; knew that the Overlords would be sure to suspect that any Velantian so temptingly present upon Ly-rane II must be there specifically for the detriment of the Delgonian race; knew that they would almost certainly refuse the proffered bait. And not only would they refuse to lead Worsel to their cavern, but in all probability they would cancel even their ordinary activities, thus making it impossible to find them at all, until they had learned definitely that the hook-bearing titbit and its accomplices had left the Lyranian solar system entirely. "No, what we need right now is a good, strong-willed Lyranian."

"Shall we go back and grab one? It would take only a few minutes," Henderson suggested, straightening up at his board.

"Uh-uh," Kinnison demurred. "That might smell a bit on the cheesy side, too, don't you think, fellows?" And Worsel and Tregonsee agreed that such a move would be ill-advised.

"Might I offer a barely tenable suggestion?" Nadreck asked diffidently.

"I'll say you can—come in."

"Judging by the rate at which Lyranians have been vanishing of late, it would seem that we would not have to wait too long before another one comes hither under her own power. Since the despised ones will have captured her themselves, and themselves will have forced her to come to them, no suspicion will be or can be aroused."

"That's a thought, Nadreck—that is a thought!" Kinnison applauded. "Shoot us up, will you, Hen? 'Way up, and hover over the center of the spread of intersections of those lines. Put observers on every plate you've

got here—you, too, Captain Craig, please, all over the ship. Have half of them search the air all around as far as they can reach for an airplane in flight; have the rest comb the terrain below, both on the surface and underground, with spy rays, for any sign of a natural or artificial cave."

"What kind of information do you think they may have, Kinnison?" asked Tregonsee the Rigellian.

"I don't know," Kinnison pondered for minutes. "Somebody—around here somewhere—has got some kind of a tie-up with some Boskonian entity or group that is fairly well up the ladder; I'm pretty sure of that. Bleeko sent ships here—one speedster, certainly, and there's no reason to suppose that it was an isolated case—"

"There is nothing to show, either, that it was not an isolated case," Tregonsee commented quietly, "and the speedster landed, not up here near the pole, but in the populated zone. Why? To secure some of the women?" The Rigellian was not arguing against Kinnison; he was, as they all knew, helping to subject every facet of the matter to scrutiny.

"Possibly—but this is a transfer point," Kinnison pointed out. "Illona was to start out from here, remember. And those two ships—coming to meet her, or perhaps each other, or—"

"Or perhaps called there by the speedster's crew, for aid," Tregonsee supplied the complete thought.

"One but quite possibly not both," Nadreck suggested. "We agreed, I think, that the probability of a Boskonian connection is sufficiently large to warrant the taking of these Overlords alive in order to read their minds?"

They were; hence the discussion then turned naturally to the question of how this none-too-easy feat was to be accomplished.

The two Patrol ships had climbed and were cruising in great, slow circles; the spy-ray men and the other observers were hard at work. Before they had found anything upon the ground, however:

"Plane, ho!" came the report, and both vessels, with spy-ray blocks out now as well as thought screens, plunged silently into a flatly slanting dive. Directly over the slow Lyranean craft, high above it, they turned as one to match its course and slowed down to match its pace.

"Come to life, Kim—don't let them have her!" Clarissa exclaimed. Being *en rapport* with them all, she knew that both unhuman Worsel and monster Nadreck were perfectly willing to let the helpless Lyranean become a sacrifice; she knew that neither Kinnison nor Tregonsee had as yet given that angle of the affair a single thought. "Surely, Kim, you don't have to let them kill her, do you? Isn't showing you the gate or whatever it is, enough? Can't you rig up something to do something with when she gets almost inside?"

"Why . . . uh . . . I s'pose so." Kinnison wrenched his attention away from a plate. "Oh, sure, Chris. Hen! Drop us down a bit, and have the boys get ready to spear that crate with a couple of tractors when I give the word."

The plane held its course, directly toward a range of low, barren, precipitous hills. As it approached them it dropped, as though to attempt a landing upon a steep and rocky hillside.

"She can't land there," Kinnison breathed, "and Overlords would want her alive, not dead—suppose I've been wrong all the time? Get ready, fellows!" he snapped. "Take her at the very last possible instant—before—she—crashes—now!" As he yelled the command the powerful beams leaped out, seizing the disaster-bound vehicle in a gently unbearably grip. Had they not done so, however, the

Lyranean would not have crashed; for in that last split second a section of the rugged hillside fell inward. In the very mouth of that dread opening the little plane hung for an instant; then:

"Grab the woman, quick!" Kinnison ordered, for the Lyranean was going to jump.

And, such was the awful measure of the Overlords' compulsion, she did jump; without a parachute, without knowing or caring what, if anything, was to break her fall. But before she struck ground a tractor beam had seized her, and passive plane and wildly struggling pilot were both borne rapidly aloft.

"Why, Kim, it's Helen!" Clarissa shrieked in surprise, then voice and manner became transformed. "The poor, poor thing," she crooned. "Bring her in at No. 6 Lock. I'll meet her there—you fellows keep clear. In the state she's in a shock—especially such a shock as seeing such a monstrous lot of males—would knock her off the beam, sure."

Helen of Lyrane ceased struggling in the instant of being drawn through the thought screen surrounding the *Dauntless*. She had not been unconscious at any time. She had known exactly what she had been doing; she had wanted intensely—such was the insidiously devastating power of the Delgonian mind—to do just that and nothing else. The falseness of values, the indefensibility of motivation, simply could not register in her thoroughly suffused, completely blanketed mind. When the screen cut off the Overlords' control, however, thus restoring her own, the shock of realization of what she had done—what she had been forced to do—struck her like a physical blow. Worse than a physical blow, for ordinary physical violence she could understand.

This mischance, however, she could not even begin to understand. It was utterly incom-

prehensible. She knew what had happened; she knew that her mind had been taken over by some monstrously alien, incredibly powerful mentality, for some purpose so obscure as to be entirely beyond her ken. To her narrow philosophy of existence, to her one-planet insularity of viewpoint and outlook, the very existence, anywhere, of such a mind with such a purpose was in simple fact impossible. For it actually to exist upon her own planet, Lyrane II, was sheerly, starkly unthinkable.

She did not recognize the *Dauntless*, of course. To her all spaceships were alike. They were all invading warships, full of enemies. All things and all beings originating elsewhere than upon Lyrane II were, perforce, enemies. Those outrageous males, the Tellurian Lensman and his cohorts, had pretended not to be inimical, as had the peculiar, white-swathed Tellurian near-person who had been worming itself into her confidence in order to study the disappearances; but she did not trust even them.

She now knew the manner of, if not the reason for, the vanishment of her fellow Lyrans. The tractors of the spaceship had saved her from whatever fate it was that impended. She did not, however, feel any thrill of gratitude. One enemy or another, what difference did it make? Therefore, as she went through the blocking screen and recovered control of her mind, she set herself to fight; to fight with every iota of her mighty mind and with every fiber of her lithe, hard-schooled, tigress' body. The air-lock doors opened and closed—she faced, not an armed and armored male all set to slay, but the white-clad person whom she already knew better than she ever would know any other non-Lyrans.

"Oh, Helen!" the girl half sobbed, throwing both arms around the still-braced Chief Person. "I'm so glad that we

got to you in time! And there will be no more disappearances, dear—the boys will see to that!"

Helen did not know, really, what disinterested friendship meant. Since the nurse had put her into a wide-open two-way, however, she knew beyond all possibility of doubt that these Tellurians wished her and all her kind well, not ill; and the shock of that knowledge, superimposed upon the other shocks which she had so recently undergone, was more than she could bear. For the first and only time in her hard, busy, purposeful life, Helen of Lyrane fainted; fainted dead away in the circle of the Earthgirl's arms.

The nurse knew that this was nothing serious; in fact, she was professionally quite in favor of it. Hence, instead of resuscitating the Lyrans, she swung the pliant body into a carry—as has been previously intimated, Clarissa MacDougall was no more a weakling physically than she was mentally—and without waiting for orderlies and stretcher she bore it easily away to her own quarters. And there, instead of administering restoratives, she took out her ubiquitous hypodermic and made sure that her patient would rest quietly for many hours to come.

### XIII.

In the meantime the more warlike forces of the *Dauntless* had not been idle. In the instant of the opening of the cavern's doors Captain Craig erupted orders, and as soon as the Lyrans were out of the line of fire, keen-eyed needle-ray men saw to it that those doors were in no mechanical condition to close. The *Dauntless* settled downward; landed in front of the entrance to the cavern. The rocky, broken terrain meant nothing to her; the hardest, jaggedest boulders crumbled instantly to dust as her enormous mass drove the file-hard, inflexible armor of her midzone deep into the ground.

Then, while alert beamers watched the entrance and while spy-ray experts combed the interior for other openings which Kinnison and Worsel were already practically certain did not exist, the forces of Civilization formed for the attack.

Worsel was fairly shivering with eagerness for the fray. His was, and with plenty of reason, the bitterest by far of all the animosities there present against the Overlords. For Delgon and his own native planet, Velantia, were neighboring worlds, circling about the same sun. 'Since the beginning of Velantian space flights, the Overlords of Delgon had preyed upon the Velantians; in fact, the Overlords had probably caused the first Velantian spaceship to be built. They had called them, in a never-ending stream, across the empty gulf of space. They had pinned them against their torture screens, had flayed them and had tweaked them to bits, had done them to death in every one of the numberless slow and hideous fashions which had been developed by a race of sadists who had been specializing in the fine art of torture for thousands upon thousands of years. Then, in the last minutes of the long-drawn-out agony of death, the Overlords were wont to feed, with a passionate, greedy, inextricably ingrained lust utterly inexplicable to any civilized mind, upon the life forces which the mangled bodies could no longer contain.

This horrible parasitism went on for ages. The Velantians fought vainly; their crude thought-screens were almost useless until after the coming of the Patrol. Then, with screens that were of real use, and with ships of power and with weapons of might, Worsel himself had taken the lead in the clean-up of Delgon. He was afraid, of course. Any Velantian was and is frightened to the very center of his being by the mere thought of an Overlord. He cannot help it; it

is in his heredity, bred into the innermost chemistry of his body; the cold grue of a thousand thousand fiendishly tortured ancestors simply will not be denied or cast aside.

Many of the monsters had succeeded in fleeing Delgon, of course. Some departed in the ships which had ferried their victims to the planet, some were removed to other solar systems by the Eich. The rest were slain; and as the knowledge that a Velantian *could* kill an Overlord gained headway, the emotions toward the oppressors generated within minds such as the Velantians' became literally indescribable. Fear was there yet, and in abundance—it simply could not be eradicated. Horror and revulsion. Sheer, burning hatred; and, more powerful than all, amounting almost to an obsession, a clamoring, shrieking, driving urge for revenge which was almost tangible. All these, and more, Worsel felt as he waited, twitching.

The Valerians wanted to go in because it meant a hand-to-hand fight. Fighting was their business, their sport, and their pleasure; they loved it for its own sweet sake, with a simple, whole-hearted devotion. To die in combat was a Valerian soldier's natural and much-to-be-desired end; to die in any peaceful fashion was a disgrace and a calamity. They did and do go into battle with very much the same joyous abandon with which a sophomore goes to meet his date in Lovers' Lane. And now, to make physical combat all the nicer and juicier, they carried semiportable tractors and pressors, for the actual killing was not to take place until after the battle proper was over. Blasting the Overlords out of existence would have been simplicity itself; but they were not to die until after they had been forced to divulge whatever they might have of knowledge or of information.

Nadreck of Palain wanted to go in solely to increase his already vast store of knowledge. His thirst for facts was a purely scientific one; the fashion in which it was to be satisfied was the veriest, the most immaterial detail. Indeed, it is profoundly impossible to portray to any human intelligence the serene detachment, the utterly complete indifference to suffering exhibited by practically all of the frigid-blooded races, even those adherent to Civilization, especially when the suffering is being done by an enemy. Nadreck did know, academically and in a philological sense, from his reading, the approximate significance of such words as "compunction," "sympathy" and "squeamishness"; but he would have been astounded beyond measure at any suggestion that they would apply to any such matter-of-fact business as the extraction of data from the mind of an Overlord of Delgon, no matter what might have to be done to the unfortunate victim in the process.

Tregonsee went in simply because Kinnison did—to be there to help out in case the Tellurian should need him.

Kinnison went in because he felt that he had to. He knew full well that he was not going to get any kick at all out of what was going to happen. He was not going to like it, any part of it. Nor did he. In fact, he wanted to be sick—violently sick—before the business was well started. And Nadreck perceived his mental and physical distress.

"Why stay, Friend Kinnison, when your presence is not necessary?" he asked, with the slightly pleased, somewhat surprised, hellishly placid mental immobility which Kinnison was later to come to know so well. "Even though my powers are admittedly small, I feel eminently qualified to cope with such minor matters as the obtainment and the accurate transmittal of that which you wish to know. I can-

not understand your emotions, but I realize fully that they are essential components of that which makes you what you fundamentally are. There can be no justification for your submitting yourself needlessly to such stresses, such psychic traumata."

And Kinnison and Tregonsee, realizing the common sense of the Palainian's statement and very glad indeed to have an excuse for leaving the outrageous scene, left it forthwith.

There is no need to go into detail as to what actually transpired within that cavern's dark and noisome depths. It took a long time, nor was any of it gentle. The battle itself, before the Overlords were downed, was bad enough in any Tellurian's eyes. Clad in armor of proof although they were, more than one of the Valerians died. Worsel's armor was shattered and rent, his almost steel-hard flesh was slashed, burned and mangled before the last of the monstrous forms was pinned down and helpless. Nadreck alone escaped unscathed—he did so, he explained quite truthfully, because he did not go in there to fight, but only to learn.

What followed the battle, however, was infinitely worse. The Delgonians, as has been said, were hard, cold, merciless, even among themselves; they were pitiless and unyielding and refractory in the extreme. It need scarcely be emphasized then, that they did not yield to persuasion either easily or graciously; that their own apparatus and equipment had to be put to its fullest grisly use before those stubborn minds gave up the secrets so grimly and so implacably sought. Worsel, the raging Velantian, used those torture tools with a vengeful savagery and a snarling ferocity which are at least partially understandable; but Nadreck employed them with a calm capability, a coldly, emotionlessly efficient callousness the mere



contemplation of which made icy shivers chase each other up and down Kinnison's spine.

At long last the job was done. The battered Patrol forces returned to the *Dauntless*, bringing with them their spoils and their dead. The cavern and its every molecule of contents were bombed out of existence. The two ships took off; Cartiff's heavily armed "merchantman" to do the long flit back to Tellus, the *Dauntless* to drop Helen and her plane off at her airport and then to join her sister superdreadnoughts which were already beginning to assemble in Rift 94.

"Come down here, will you

please, Kim?" came Clarrissa's thought. "I've been keeping her pretty well blocked out, but she wants to talk to you—in fact, she insists upon it—before she leaves the ship."

"Hm-m-m—now that *is* something!" the Lensman exclaimed, and hurried to the nurse's cabin.

There stood the Lyranian queen; a full five inches taller than Mac's five feet six, a good thirty-five pounds heavier than Mac's not inconsiderable one hundred and forty-five. Hard, fine, supple; erectly poised she stood there, an exquisitely beautiful statue of pale bronze, her flaming hair a gorgeous riot. Head held proudly high, she

stared only slightly upward into the Earthman's quiet, understanding eyes.

"Thanks, Kinnison, for everything that you and yours have done for me and mine," she said simply, and held out her right hand in what she knew was the correct Tellurian gesture.

"Uh-uh, Helen," Kinnison denied, gently, making no motion to grasp the proffered hand—which was promptly and enthusiastically withdrawn. "Nice, and its really big of you, but don't strain yourself." This was neither slang nor sarcasm; he meant precisely and only what he said. "Don't overdrive in trying to force yourself to like us

men too much or too soon; you must get used to us gradually. We like you a lot, and we respect you even more, but we have been around and you haven't. You can't be feeling friendly enough yet to enjoy shaking hands with me—you certainly haven't got jets enough to swing *that* load—so this time we'll take the thought for the deed. Keep trying, though, Toots old girl, and you'll make it yet. In the meantime we're all pulling for you, and if you ever need any help, shoot us a beam on the communicator Chris is giving you. Clear ether, ace!"

"Clear ether, MacDougall and Kinnison!" Helen's eyes were softer than either of the Tellurians had ever seen them before. "There is, I think, something of wisdom, of efficiency, in what you have said. It may be . . . that is, there is a possibility . . . you of Civilization are, perhaps, persons—of a sort that is—after all. Thanks—*really* thanks, I mean, this time. Good-by."

Helen's plane had already been unloaded. She disembarked and stood beside it; watching, with a peculiarly untranslatable expression, the huge cruiser until it was out of sight.

"It was just like pulling teeth for her to be civil to me," Kinnison grinned at his fiancée, "but she finally made the lift. She's a grand girl, that Helen, in her peculiar, poisonous way."

"Why, Kim!" Mac protested. "She's nice, really, when you get to know her. And she's so stunningly, so ravishingly beautiful!"

"Uh-huh," Kinnison agreed, without a trace of enthusiasm. "Cast her in chilled stainless steel—she'd just about do as she is, without any casting—and she'd make a mighty fine statue."

"Kim! Shame on you!" the girl exclaimed. "Why, she's the most perfectly *beautiful* thing I ever saw in my whole life!" Her voice softened. "I wish that I

looked like that," she added wistfully.

"She's beautiful enough—in her way—of course," the man admitted, entirely unimpressed. "But, then, so is a Radelegian cateagle, so is a spire of frozen helium, and so is a six-foot-long, armor-piercing punch. As for you wanting to look like her—I'm terrifically glad that you don't. That's sheer tripe, Chris, and you know it. If you want to look at something *really* beautiful, get a mirror—beside you, all the Helens that ever lived, with Cleopatra, Dessa Desplaines and Ilona Potter thrown in, wouldn't make a baffled flare—"

That was, of course, what she wanted him to say; and what followed is of no particular importance here.

Shortly after the *Dauntless* cleared the stratosphere, Nadreck reported that he had finished assembling and arranging the data, and Kinnison called the Lensmen together in his con room for an ultraprivate conference. Worsel, it appeared, was still in the surgery.

"Smatter, doc?" Kinnison asked, casually. He knew that there was nothing really serious the matter—Worsel had come out of the cavern under his own power, and a Velantian recovers with startling rapidity from any wound which does not kill him outright. "Having trouble with your stitching?"

"I'll say we are!" the surgeon grunted. "Have to bore holes with an electric drill and use linemen's pliers. Just about done now, though—he'll be with you in a couple of minutes," and in a very little more than the stipulated time the Velantian joined the other Lensmen.

He was bandaged and taped, and did not move at his customary headlong pace, but he fairly radiated self-satisfaction, bliss and contentment. He felt better, he declared, than he had

at any time since he cleaned out the last cavern upon Delgon.

Kinnison stopped the interplay of thoughts by starting up his Lensman's projector. This mechanism was something like the ordinary three-dimensional color-and-sound machine, except instead of emitting sounds it radiated thoughts. Sometimes the thoughts of one or more Overlords, at other times the thoughts of the Eich or other beings as registered upon the minds of the Overlords, at still others the thoughts of Nadreck or of Worsel explaining or amplifying a preceding thought passage or some detail which was being shown at the moment. The spool of tape now being run, with others, formed the Lensmen's record of what they had done. This record would go to Prime Base under Lensman's Seal; that is, only a Lensman could handle it or see it. Later, after the emergency had passed, copies of it would go to various Central Libraries and thus become available to properly accredited students. Indeed, it is only from such records, made upon the scene and at the time by keen-thinking, logical, truth-seeking Lensmen, that such a factual, minutely detailed history as this can be compiled; and your historian is supremely proud that he was the first person other than a Lensman to be allowed to study a great deal of this priceless data.

Worsel knew the gist of the report, Nadreck the compiler knew it all; but to Kinnison, Mac and Tregonsee the unweaving of the tape brought shocking news. For, as a matter of fact, the Overlords had known more, and there was more in the Lyranian solar system to know than Kinnison's wildest imaginings had dared to suppose. That system was one of the main focal points for the zwilnik business of an immense volume of space; Lyrane II was the meeting place, the dispatcher's office, the nerve center from which thousands of



invisible, immaterial lines reached out to thousands of planets peopled by warm-blooded oxygen breathers. Menjo Bleeko had sent to Lyrane II not one expedition, but hundreds of them; the affair of Illona and her escorts had been the veriest, the most trifling incident.

The Overlords, however, did not know of any Boskonian in the Second Galaxy. They had no superiors, anywhere. The idea of anyone or anything anywhere being superior to an Overlord was unthinkable. They did, however, co-operate with—here came the really stunning fact—certain of the Eich who lived upon eternally dark Lyrane VIII, and who managed things for the frigid-blooded, poison-breathing Boskonians of the region in much the same fashion as the Overlords did for the warm-blooded, light-loving races. To make the co-operation easier and more efficient, the two planets were connected by a hyper-spatial tube.

"Just a sec!" Kinnison interrupted, as he stopped the machine for a moment. "The Overlords were kidding themselves a bit there, I think—they must have been. If they didn't report to or get orders from the Second Galaxy or some other higher-up office, the Eich must have; and since the records and plunder and stuff were not in the cavern, they must be upon Eight. Therefore, whether they realized it or not, the Overlords must have been inferior to the Eich and under their orders. Check?"

"Check," Nadreck agreed. "Worsel and I concluded that they knew the facts, but were covering up even in their own minds, to save face. Our conclusions, and the data from which they were derived, are in the introduction—another spool. Shall I get it?"

"By no means—just glad to have the point cleared up, is all. Thanks—" and the showing went on.

The principal reason why the Lyranian system had been chosen for that important headquarters was that it was one of the very few outlying solar systems, completely unknown to the scientists of the Patrol, in which both the Eich and the Overlords could live in their natural environments. Lyrane VIII was, of course, intensely, bitterly cold. This quality is not rare, since all No. 8 planets are; its uniqueness lay in the fact that its atmosphere was almost exactly like that of Jarnevon.

And Lyrane II suited the Overlords perfectly. Not only did it have the correct temperature, gravity and atmosphere, but also it offered that much rarer thing without which no cavern of Overlords would have been content for long—a native life form possessing strong and highly vital minds upon which they could prey.

There was more, much more; but the rest of it was not directly pertinent to the immediate question. The tape ran out, Kinnison snapped off the projector, and the Lensmen went into a five-way.

Why was not Lyrane II defended? Worsel and Kinnison had already answered that one. Secretiveness and power of mind, not armament, had always been the natural defenses of all Overlords. Why hadn't the Eich interfered? That was easy, too. The Eich looked after themselves—if the Overlords couldn't, that was just too bad. The two ships that had come to aid and had remained to revenge had certainly not come from Eight—their crews had been oxygen breathers. Probably a rendezvous—immaterial, anyway. Why wasn't the whole solar system ringed with outposts and screens? Too obvious. Why hadn't the *Dauntless* been detected? Because of her nullifiers; and if she had been spotted by any short-range stuff she had been mistaken for another zwilnik ship. They hadn't detected

anything out of the way upon Eight because it had not occurred to anybody to swing an analyzer upon that particular planet. They would find that Eight was defended plenty. Had the Eich had time to build defenses? They must have had, or they wouldn't be there—they certainly were not taking that kind of chances. And, by the way, hadn't they better do a bit of snooping near Lyrane VIII before they went back to join the *Z9M9Z* and the Fleet? They had.

Thereupon the *Dauntless* faced about and retraced her path toward the now highly important system of Lyrane. In their previous approaches the Patrolmen had observed the usual precautions to avoid revealing themselves to any zwilnik vessel which might have been on the prowl. Those precautions were now intensified to the limit, since they knew that Lyrane VIII was the site of a base manned by the Eich themselves.

As the big cruiser crept toward her goal, nullifiers full out and every instrument of detection and reception as attentively outstretched as the whiskers of a tomcat slinking along a black alley at midnight, the Lensmen again pooled their brains in conference.

The Eich. This was going to be no pushover. Even the approach would have to be figured to a hair; because, since the Boskonians had decided that it would be poor strategy to screen in their whole solar system, it was a cold certainty that they would have their own planet guarded and protected by every device which their inhuman ingenuity could devise. The *Dauntless* would have to stop just outside the range of the electromagnetic detection, for the Boskonians would certainly have a five-hundred-percent overlap. Their nullifiers would hash up the electros somewhat, but there was no use in taking too

many chances. Previously, on right-line courses to and from Lyrane II, that had not mattered, for two reasons—not only was the distance extreme for accurate electro work, but also it would have been assumed that their ship was a zwilnik. Laying a course for Eight, though, would be something else entirely. A zwilnik would take the tube, and they would not, even if they had known where it was.

That left the visuals. The cruiser was a mighty small target at interplanetary distances; but there were such things as electronic telescopes, and the occultation of even a single star might prove disastrous. Kinnison called the chief pilot.

"Stars must be thin in certain regions of the sky out here, Hen. Suppose you can pick us out a line of approach along which we will occult no stars and no bright nebulae?"

"I should think so, chief—just a sec; I'll see— Yes, easily. There is a lot of black background, especially to the nadir"—and the conference continued.

They would have to go through the screens of electros in Kinnison's inherently undetectable black speedster. QX, but she was nobody's fighter—she didn't have a beam hot enough to light a match. And besides, there were the thought screens and the highly probable other stuff about which the Lensmen could know nothing.

Kinnison quite definitely did not relish the prospect. He remembered all too vividly what had happened when he had scouted the Eich's base upon Jarnevon; when it was only through Worsel's aid that he had barely—just barely—escaped with his life. And Jarnevon's defenders had probably been exerting only routine precautions, whereas these fellows were undoubtedly cocked and primed for the Lensman. He would go in, of course, but he'd probably come out feet first—he didn't know any more about their de-

fenses than he had known before, and that was nothing, flat.

"Excuse the interruption, please," Nadreck's thought apologized, "but it would seem to appear more desirable, would it not, to induce the one of them possessing the most information to come out to us?"

"Huh?" Kinnison demanded. "It would, of course—but how in all your purple hells do you figure on swinging *that* load?"

"I am, as you know, a person of small ability," Nadreck replied in his usual circuitous fashion. "Also, I am of almost negligible mass and strength. Of what is known as bravery I have no trace—in fact, I have pondered long over that, to me, incomprehensible quality and have decided that it has no place in my scheme of existence. I have found it much more efficient to perform the necessary tasks in the easiest possible manner, which is usually by means of stealth, deceit, indirection and other cowardly artifices."

"Any of those, or all of them, would be QX with me," Kinnison assured him. "Anything goes, with gusto and glee, as far as the Eich are concerned. What I don't see is how we can put it across."

"Thought screen interfered so seriously with my methods of procedure," the Palainian explained, "that I was forced to develop a means of puncturing them without upsetting their generators. The device is not generally known, as it is still in a very crude, experimental form; but it does function, in a meager, unsatisfactory way. Might I suggest that the four of you put on heated armor and come with me to my vessel in the hold? It will take some little time to transfer my apparatus and equipment to your speedster."

"Is it nonferrous—undetectable?" Kinnison asked.

"Of course," Nadreck replied in surprise. "I work, as I told you, by stealth. My vessel is,

except for certain differences necessitated by racial considerations, a duplicate of your own."

"Why didn't you say so?" Kinnison wanted to know. "Why bother to move the gadget? Why not use your speedster?"

"Because I was not asked. We should not bother. The only reason for using your vessel is so that you will not suffer the discomfort of wearing armor," Nadreck replied, categorically.

"Cancel it, then," Kinnison directed. "You've been wearing armor all the time you were with us—turn about for a while will be QX. Better that way, anyway, as this is very definitely your party, not ours. Not?"

"As you say; and with your permission," Nadreck agreed. "Also it may very well be that you will be able to suggest improvements in my device whereby its efficiency may be increased."

"I doubt it." The Tellurian's already great respect for this retiring, soft-spoken, "cowardly" Lensman was increasing constantly. "But we would like to study it, and perhaps copy it, if you so allow."

"Gladly."

And so it was arranged.

The *Dauntless* crept among a black backgrounded pathway and stopped. Nadreck, Worsel and Kinnison—three were enough and neither Mac nor Tregonsee insisted upon going—boarded the Palainian speedster.

Away from the mother ship it sped upon muffled jets, and through the far-flung, heavily overlapped electromagnetic detector zones. Through the outer thought screens. Then, ultra-slowly, as space speeds go, the speedster moved forward, feeling for whatever other blocking screens there might be.

All three of those Lensmen were in fact detectors themselves—their Arisian-imparted special senses made ethereal, even sub-ethereal, vibrations actually visible or tangible—but they did not depend only upon their bodily

senses. That speedster carried instruments unknown to space pilotry, and the Lensmen used them unremittently. When they came to a screen they opened it, so insidiously that its generating mechanisms gave no alarms. Even a meteorite screen, which was supposed to forbid the passage of any material object, yielded without protest to Nadreck's subtle manipulation.

Slowly, furtively, a perfectly absorptive black body sinking through blackness so intense as to be almost palpable, the Palainian speedster settled downward toward the Boskonian fortress of Lyrane VIII.

#### XIV.

This is perhaps as good a place as any to glance in passing at the fashion in which the planet Lonabar was brought under the aegis of Civilization. No attempt will or can be made to describe it in any detail, since any adequate treatment of it would fill a volume—indeed, many volumes have already been written concerning various phases of the matter—and since it is not strictly germane to the subject in hand. However, some knowledge of the modus operandi in such cases is highly desirable for the full understanding of this history, in view of the vast number of planets which Co-ordinator Kinnison and his associates did have to civilize before the Second Galaxy was made secure.

Scarcely had Cartiff-Kinnison moved out than the Patrol moved in. If Lonabar had been heavily fortified, a fleet of appropriate size and power would have cleared the way. As it was, the fleet which landed was one of transports, not of battleships, and all the fighting from then on was purely defensive.

Propagandists took the lead; psychologists; Lensmen skilled not only in languages but also in every art of human relationships. The case of Civilization was stated plainly and repeatedly, the errors and the fallacies of au-

tocracy were pointed out. A nucleus of government was formed; not of Civilization's imports, but of solid Lonabarian citizens who had passed the Lensmen's tests of ability and trustworthiness.

Under this local government a pseudodemocracy began haltingly to function. At first its progress was painfully slow; but as more and more of the citizens perceived what the Patrol actually was doing, it grew apace. Not only did the invaders allow—yes, foster—free speech and statutory liberty; they suppressed ruthlessly any person or any faction seeking to build a new dictatorship, whatever its nature, upon the ruins of the old. That news traveled fast; and laboring always and mightily upon Civilization's side were the always-present, however deeply buried, urges of all intelligent entities toward self-expression.

There was opposition, of course. Practically all of those who had waxed fat upon the old order were very strongly in favor of its continuance. There were the hordes of the down-trodden who had so long and so dumbly endured oppression that they could not understand anything else; in whom the above-mentioned urges had been beaten and tortured almost out of existence. They themselves were not opposed to Civilization—for them it meant at worst only a change of masters—but those who sought by the same old wiles to re-enslave them were foes indeed.

Menjo Bleeko's sycophants and retainers were told to work or starve. The fat hogs could support the new order—or else. The thugs had to choose between honest co-operation with their fellow men and flitting to some zwilnik planet. Those who tried to prey upon and exploit the dumb masses were extirpated, one and all.

Little could be done, however, about the dumb themselves, for in them the spark was feeble in-

deed. The new government nursed that spark along, the while ruling them as definitely, although not as harshly, as had the old; the Lensmen backing the struggling young Civilization knowing full well that in the children or in the children's children of these unfortunates the spark would flame up into a great, white light.

It is seen that this government was not, and could not for many years become, a true democracy. It was in fact a benevolent semiautocracy; autonomous in a sense, yet controlled by the Galactic Council through its representatives, the Lensmen. It was, however, so infinitely more liberal than anything theretofore known by the Lonabarians as to be a political revelation, and since corruption, that cosmos-wide curse of democracy, was not allowed a first finger-hold, the principles of real democracy and of Civilization took deeper root year by year.

To get back into the beam of narrative, Nadreck's blackly undetectable speedster settled to ground far from the Boskonians' central dome; well beyond the far-flung screens. The Lensmen knew that no life existed outside that dome and they knew that no possible sense of perception could pierce those defenses. They did not know, however, what other resources of detection, of offense or of defense the foe might possess; hence the greatest possible distance at which they could work efficiently was the best distance.

"I realize that it is useless to caution any active mind not to think at all," Nadreck remarked as he began to manipulate various and sundry controls, "but you already know from the nature of our problem that any extraneous thought will wreak untold harm. For that reason I beg of you to keep your thought screens up at all times, no matter what happens. It is, however, imperative that you be kept in-

formed, since I may require aid or advice at any moment. To that end I ask you to hold these electrodes, which are connected to a receptor. Do not hesitate to speak freely to each other or to me; but please use only a spoken language, as I am averse even to Lensed thoughts at this juncture. Are we agreed? Are we ready?"

They were agreed and ready. Nadreck actuated his peculiar drill—a tube of force somewhat analogous to a Q-type helix except in that it operated within the frequency range of thought—and began to increase, by almost infinitesimal increments, its power. Nothing, apparently, happened; but finally the instruments upon the speedster's board registered the fact that it was through.

"This is none too safe, friends," the Palainian announced from one part of his multicompartmented brain, without distracting any part of his attention from the incredibly delicate operation he was performing. "Might I suggest, Kin-nison, in my cowardly way, that you place yourself at the controls and be ready to take us away from this planet at speed and without notice?"

"I'll say you may!" and the Tellurian complied, with alacrity. "I'd a lot rather be a live coward than a dead hero!"

But through course after

course of screen the hollow drill gnawed its cautious way without giving alarm; until at length there began to come through the interloping tunnel a vague impression of foreign thought. Nadreck stopped the helix, then advanced it by tiny steps until the thoughts came in coldly clear—the thoughts of the Eich going about their routine businesses. In the safety of their impregnable shielded dome the proudly self-confident monsters did not wear their personal thought screens; which, for Civilization's sake, was just as well.

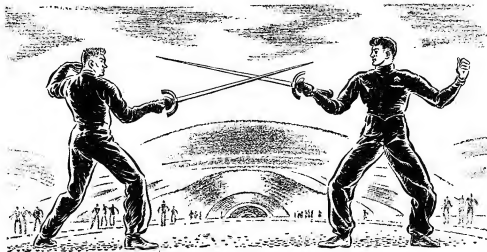
It had been decided previously that the mind they wanted would be that of a psychologist; hence the thought sent out by the Palainian was one which would appeal only to such a mind; in fact, one practically imperceptible to any other. It was extremely faint; wavering uncertainly upon the very threshold of perception. It was so vague, so formless, so inchoate that it required Kennison's intensest concentration even to recognize it as a thought. Indeed, so starkly unhuman was Nadreck's mind and that of his proposed quarry that it was all the Tellurian Lensman could do to so recognize it. It dealt, fragmentarily and in the merest glimmerings, with the nature and the mechanisms of the First Cause; with the fundamental ego, its *raison d'être*, its causa-

tion, its motivation, its differentiation; with the stupendously awful concepts of the Prime Origin of all things ever to be.

Unhurried, monstrosly patient, Nadreck neither raised the power of the thought nor hastened its slow tempo. Stolidly, for minute after long minute he held it, spraying it throughout the vast dome as mist is sprayed from an atomizer nozzle. And finally he got a bite. A mind seized upon that wistful, homeless, incipient thought; took it for its own. It strengthened it, enlarged upon it, built it up. And Nadreck followed it.

He did not force it; he did nothing whatever to cause any suspicion that the thought was or ever had been his. But as the mind of the Eich busied itself with that thought he all unknowingly let down the bars to Nadreck's invasion.

Then, perfectly in tune, the Palainian subtly insinuated into the mind of the Eich the mildly disturbing idea that he had forgotten something, or had neglected to do some trifling thing. This was the first really critical instant, for Nadreck had no idea whatever of what his victim's duties were or what he could have left undone. It had to be something which would take him out of the dome and toward the Patrolmen's concealed speedster, but what it was, the Eich would have to develop for himself:



Nadreck could not dare to attempt even a partial control at this stage and at this distance.

Kinnison clenched his teeth and held his breath, his big hands clutching fiercely the pilot's bars; Worsel unheeding coiled his supple body into an ever smaller, ever harder and more compact bale.

"Ah!" Kinnison exhaled explosively. "It worked!" The psychologist, at Nadreck's impalpable suggestion, had finally thought of the thing. It was a thought-screen generator which had been giving a little trouble and which really should have been checked before this.

Calmly, with the mild self-satisfaction which comes of having successfully recalled to mind a highly elusive thought, the Eich opened one of the dome's unforcible doors and made his unconcerned way directly toward the waiting Lensmen; and as he approached Nadreck, stepped up by logarithmic increments the power of his hold.

"Get ready, please, to cut your screens and to synchronize with me in case anything slips and he tries to break away," Nadreck cautioned; but nothing slipped.

The Eich came up unseeing to the speedster's side and stopped. The drill disappeared. A thought screen encompassed the group narrowly. Kinnison and Worsel released their screens and also tuned in to the creature's mind. And Kinnison swore briefly, for what they found was meager enough. It was well, however, that they got what they did when they did; for, as has been seen, even that little was very shortly thereafter to be removed.

He knew a great deal concerning the zwilnik doings of the First Galaxy; but so did the Lensmen; they were not interested in them. Neither were they interested, at the moment, in the files or in the records. Regarding the higher-ups, he knew of two, and only two, personalities. By means of an in-

tergalactic communicator he received orders from, and reported to, a clearly defined, somewhat Eichlike entity known to him as Kandron; and vaguely, from occasional stray and unintentional thoughts of this Kandron, he had visualized as being somewhere in the background a human being named Alcon. He supposed that the planets upon which these persons lived were located in the Second Galaxy, but he was not certain, even of that. He had never seen either of them; he was pretty sure that none of his group ever would be allowed to see them. He had no means of tracing them and no desire whatsoever to do so. The only fact he really knew was that at irregular intervals Kandron got into communication with this base of the Eich.

That was all. Kinnison and Worsel let go and Nadreck, with a minute attention to detail which would be wearisome here, jockeyed the unsuspecting monster back into the dome. The native knew fully where he had been, and why. He had inspected the generator and had found it in good order. Every second of elapsed time was accounted for exactly. He had not the slightest inkling that anything out of the ordinary had happened to him or anywhere around him.

As carefully as the speedster had approached the planet, she departed from it. She rejoined the *Dauntless*, in whose control room Kinnison lined out a solid communicator beam to the *Z9M9Z* and to Port Admiral Haynes. He reported crisply, rapidly, everything that had transpired.

"So our best bet, chief, is for you and the Fleet to get out of here as fast as Klono will let you," he concluded. "Go straight out Rift 94, staying as far away as possible from both the spiral arm and the Galaxy proper. Unlimber every spotting screen you've got—put them to work along the line between Lyrane

and the Second Galaxy. Plot all the punctures, extending the line as fast as you can. We'll join you at max and transfer to the *Z9M9Z*—her tank is just what the doctors ordered for the job we've got to do."

"Well, if you say so, I suppose that's the way it's got to be," Haynes grumbled. He had been growling and snorting under his breath ever since it had become evident what Kinnison's recommendation was to be. "I don't like this thing of standing by and letting zwilniks thumb their noses at us, like Prellin did on Bronseca. That once was once too damned often."

"Well, you got him, finally, you know," Kinnison reminded, quite cheerfully, "and you can have these Eich, too—sometime."

"I hope," Haynes acquiesced, something less than sweetly. "QX, then—but put out a few jets. The quicker you get out here the sooner we can get back and clean out this hooraw's nest."

Kinnison grinned as he cut his beam. He knew that it would be some time before the port admiral could hurl the metal of the Patrol against Lyrane VIII; but even he did not realize just how long a time it was to be.

What occasioned the delay was not the fact that the communicator was in operation only at intervals; so many screens were out, they were spaced so far apart, and the punctures were measured and aligned so accurately that the periods of non-operation caused little or no loss of time. Nor was it the vast distance involved; since, as has already been pointed out, the matter in the intergalactic void is so tenuous that spaceships are capable of enormously greater velocities than any attainable in the far denser medium filling interstellar space.

No; what gave the Boskonians of Lyrane VIII their greatly lengthened reprieve was simply the direction of the line established by the communicator-

beam punctures. Reasoning from analogy, the Lensmen had supposed that it would lead them into a star cluster, fairly well away from the main body of the Galaxy in either the zenith or the nadir direction. Instead of that, however, when the Patrol surveyors got close enough to the Second Galaxy so that their cone of possible error was very small in comparison with the gigantic lens of the island universe which they were approaching, it became clear that their objective lay deep within the Galaxy itself. At least, the prolongation of their line led well into it, and that fact gave the Lensmen to pause.

"I don't like this line a bit, chief," Kinnison told the admiral then. "Maybe it runs into a cluster on this side, but we can't figure on it. It'd smell like Limburger to have a fleet of this size and power nosing into their home territory, along what must be one of the hottest lines of communication they've got."

"Check," Port Admiral Haynes agreed. "QX so far, but it would begin to stink pretty quick now. We've got to assume that they know about spotting screens, whether they really do or not. If they do, they'll have this line trapped from stem to gudgeon, and the minute they detect us they'll cut this line out entirely. Then where'll you be?"

"Right back where I started from—that's what I'm yapping about. And to make matters worse, it's a thousand to one that the ape we are looking for is not going to be anywhere near the end of this line."

"Huh? How do you dope that out?" Haynes demanded.

"Logic. We're getting up now to where these zwilniks can really think. You have already assumed that they know that we can trace their beam, and we know that they know about our detector nullifiers. Go further. Assume that they have deduced, from things we have already

done, that we have ships—one or two, at least—that are inherently undetectable and almost perfectly absorptive. Where does that land you?"

"Hm-m-m. I see. Since they can't change the nature of the beam, they would run it through a series of relays, with each leg trapped with everything they could think of, and at the first sign of interference with any one of them they would switch to another, maybe halfway across the Galaxy. Also, they might very well move it around once in a while, anyway, just on general principles."

"Check. That's why you had better take the Fleet back home, leaving Nadreck and me to work the rest of this line with our speedsters."

"Don't be silly, son—I thought you could think"—and Haynes gazed quizzically at the younger man.

"What else? Where am I overlooking a bet?" Kinnison demanded.

"It is elementary tactics, young man," the admiral instructed, "to cover up any small, quiet operation with a large and noisy one. Thus, if I want to make an exploratory sortie in one sector I should always attack in force in another."

"But what would it get us?" Kinnison expostulated. "What's the advantage to be gained, to make up for the unavoidable losses?"

"Don't be dumb. Advantage? Listen!" Haynes' bushy gray hair fairly bristled in eagerness. "We've been on the defensive long enough. They must be weak, after their losses at Tellus; and now, before they can rebuild, is the time to strike. It's good tactics, as I said, to make a diversion to cover you up, but I want to do more than that. I think that we had better start an actual, serious invasion, right now. When you can swing it, the best possible defense—even in general—is a powerful offense, and we're all set to go.

We will begin it with this fleet, and then, as soon as we are sure that they haven't got enough power to counter-invade, we will bring up everything we have except for some purely defensive stuff, such as sunbeams and so on, around Tellus and the other most important bases. We'll hit them so hard that they won't be able to worry about such a little thing as a communicator line."

"Hm-m-m. Never thought of it from that angle, but it'd be nice. We are coming over here sometime, anyway—why not now? I suppose that you'll start on the edge, or in a spiral arm, just as though you were going ahead with the conquest of the whole Galaxy?"

"Not 'just as though,'" Haynes declared. "We are going through with it. Find a planet on the outer edge of a spiral arm, as nearly like Tellus as possible—"

"Make it nearly enough like Tellus and maybe I can use it for our headquarters on this 'coordinator' thing." And Kinnison grinned.

"More truth than poetry in that, fellow. We find it and take it over. Comb out the zwilniks with a fine-tooth comb. Make it the biggest, toughest base the Universe ever saw—like Jarnevon, only more so. Bring in everything we've got and expand from that planet as a center, cleaning everything out as we go. We'll civilize 'em!"

And so, after considerable ultrarange communicator work, it was decided that the Galactic Patrol would forthwith assume the offensive.

Haynes assembled the Fleet. Then, while the two black speedsters kept unobtrusively on with the task of plotting the line, Civilization's mighty armada moved a few thousand parsecs aside and headed at normal touring blast for the nearest outcropping of the Second Galaxy.

There was nothing of stealth in this maneuver, nothing of finesse, excepting in the arrange-

ments of the units. First, far in the van, flew the prodigious, irregular cone of scout cruisers. They were comparatively small, not heavily armed or armored, but they were ultrafast and were provided with the most powerful detectors, spotters and locators known. They adhered to no rigid formation, but at the will of their individual commanders, under the direct supervision of Grand Fleet Operations in the *Z9M9Z*, flashed hither and thither ceaselessly—searching, investigating, mapping, reporting.

Backing them up came the light cruisers and the cruising bombers—a new type, this latter, designed primarily to bore in to close quarters and to hurl bombs of negative matter. Third in order were the heavy defensive cruisers. These ships had been developed specifically for hunting down Boskonian commerce raiders within the Galaxy. They were practically an impenetrable screen, so that they could lock to and hold even a superdreadnought. They had never before been used in Grand Fleet formation; but since they were now equipped with tractor zones and bomb tubes, theoretical strategy found a good use for them in this particular place.

Next came the real war head—a solidly packed phalanx of maulers. All the ships up ahead had, although in varying degrees, freedom of motion and of action. The scouts had practically nothing else; fighting was not their business. They could fight, a little, if they had to; but they always ran away if they could, in whatever direction was most expedient at the time. The cruising bombers could either take their fighting or leave it alone, depending upon circumstances—in other words, they fought light cruisers, but ran away from big stuff, stinging as they ran. The heavy cruisers would fight anything short of a mauler, but never in formation: they always broke ranks and

fought individual dog fights, ship to ship.

But that terrific spearhead of maulers had no freedom of motion whatever. It knew only one direction—straight ahead. It would swerve aside for an inert planet, but for nothing smaller; and when it swerved it did so as a whole, not by parts. Its function was to blast through—straight through—any possible opposition, if and when that opposition should have been successful in destroying or dispersing the screens of lesser vessels preceding it. A sunbeam was the only conceivable weapon with which that stolid, power-packed mass of metal could not cope; and, the Patrolmen devoutly hoped, the *zwilniks* didn't have any sunbeams—yet.

A similar formation of equally capable maulers, meeting it head-on, could break it up, of course. Theoretical results and war game solutions of this problem did not agree, either with each other or among themselves, and the thing had never been put to the trial of actual battle. Only one thing was certain—when and if that trial did come there was bound to be, as in the case of the fabled meeting of the irresistible force with the immovable object, a lot of very interesting by-products.

Flanking the maulers, streaming gracefully backward from their massed might in a parabolic cone, were arranged the heavy battleships and the superdreadnoughts; and directly behind the bulwark of flying fortresses, tucked away inside the protecting envelope of big battle wagons, floated the *Z9M9Z*—the brains of the whole outfit.

There were no free planets, no negaspheres of planetary antimass, no sunbeams. Such things were useful either in the defense of a Prime Base or for an all-out, ruthlessly destructive attack upon such a base. Those slow, cumbersome, supremely powerful weapons would come later, after the Patrol had se-

lected the planet which they intended to hold against everything which the Boskonians could muster. This present expedition had as yet no planet to defend, it sought no planet to destroy. It was the vanguard of Civilization, seeking a suitable foothold in the Second Galaxy and thoroughly well equipped to argue with any force mobile enough to bar its way.

While it has been said that there was nothing of stealth in this approach to the Second Galaxy, it must not be thought that it was unduly blatant or obvious—any carelessness or ostentation would have been very poor tactics indeed. Civilization's Grand Fleet advanced in strict formation, with every routine military precaution. Its nullifiers were full on, every blocking screen was out, every plate upon every ship was hot and was being scanned by alert and keen-eyed observers.

But every staff officer from Port Admiral Haynes down, and practically every line officer as well, knew that the enemy would locate the invading fleet long before it reached even the outer fringes of the galaxy toward which it was speeding. That stupendous tonnage of ferrous metal could not be disguised; nor could it by any possible artifice be made to simulate any normal tenant of the space which it occupied.

The gigantic flares of the heavy stuff could not be baffled, and the combined grand flare of Grand Fleet made a celestial object which would certainly attract the electronic telescopes of plenty of observatories. And the nearest such 'scopes, instruments of incredible powers of resolution, would be able to pick them out, almost ship by ship, against the relatively brilliant background of their own flares.

The Patrolmen, however, did not care. This was, and was intended to be, an open, straightforward invasion; the first wave

of an attack which would not cease until the Galactic Patrol had crushed Boskonian throughout the entire Second Galaxy.

Grand Fleet bored serenely on. Superbly confident in her awful might, grandly contemptuous of whatever she was to face, she stormed along; uncaring that at that very moment the foe was massing his every defensive arm to hurl her back or to blast her out of existence.

## XV.

As Haynes and the Galactic Council had already surmised, Boskonian was now entirely upon the defensive. She had made her supreme bid in the effort which had failed so barely to overcome the defenses of hard-held Tellus. It was, as has been seen, a very near thing indeed, but the zwilnik chieftains did not and could not know that. Communication through the hyperspatial tube was impossible, no ordinary communicator beam could be driven through the Patrol's scramblers, no Boskonian observers could be stationed near enough to the scene of action to perceive or to record anything that had occurred, and no single zwilnik ship or entity survived to tell of how nearly Tellus had come to extinction.

And, in fine, it would have made no difference in the mind of Alcon of Thrale if he had known. A thing which was not a full success was a complete failure; to be almost a success meant nothing. The invasion of Tellus had failed. They had put everything they had into that gigantically climactic enterprise. They had shot the whole wad, and it had not been enough. They had, therefore, abandoned for the nonce humanity's galaxy entirely, to concentrate their every effort upon the rehabilitation of their own depleted forces and upon the design and construction of devices of hitherto unattempted capability and power.

But they simply had not had

enough time to prepare properly to meet the invading Grand Fleet of Civilization. It takes time—lots of time—to build such heavy stuff as maulers and flying fortresses, and they had not been allowed to have it. They had plenty of lighter stuff, since the millions of Boskonian planets could furnish upon a few hours' notice more cruisers, and even more first-line battleships, than could possibly be used in Grand Fleet formation, but their backbone of brute force and firing power was woefully weak.

Since the destruction of a solid center of maulers was, theoretically, improbable to the point of virtual impossibility, neither Boskonian nor the Galactic Patrol had built up any large reserve of such structures. Both would now build up such a reserve as rapidly as possible, of course, but half-built structures could not fight.

The zwilniks had many dirigible planets, but they were too big. Planets, as has been seen, are too cumbersome and unwieldy for use against a highly mobile and adequately controlled fleet.

Conversely, humanity's Grand Fleet was up to its maximum strength and perfectly balanced. It had suffered staggering losses in the defense of Prime Base, it is true; but those losses were of comparatively light craft, which Civilization's inhabited worlds could replace as easily and as quickly as could Boskonian's. Very few maulers had been lost, and those empty places were filled by substitutes withdrawn from minor bases or other stations at which they were not imperatively necessary.

Hence, Boskonian's fleet was at a very serious disadvantage as it formed to defy humanity just outside the rim of its galaxy. At two disadvantages, really, for Boskonian then had neither Lensmen nor a Z9M92; and Haynes, canny old master strategist that he was, worked upon them both.

Grand Fleet so far had held

to one right-line course, and upon this line the zwilnik defense had been built. Now Haynes swung aside, forcing the enemy to re-form—they had to engage him, he did not have to engage them. Then, as they shifted—raggedly, as he had supposed and had hoped that they would—he swung again. Again, and again; the formation of the enemy becoming more and more hopelessly confused with each shift.

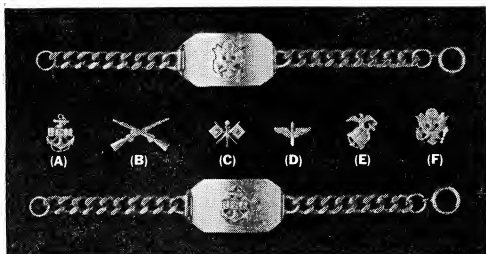
The scouts had been reporting constantly; in the seven-hundred foot lenticular tank of the *Directrix* there was spread in exact detail the disposition of every unit of the foe. Four Rigellian Lensmen, now thoroughly trained and able to perform the task almost as routine, condensed the picture—summarized it—in Haynes' ten-foot tactical tank. And finally, so close that another swerve could not be made, and with the line of flight of his solid fighting core pointing straight through the loosely disorganized nucleus of the enemy, Haynes gave the word to engage.

The scouts, remaining free, flashed aside into their pre-arranged observing positions. Everything else went inert and bored ahead. The light cruisers and the cruising bombers clashed first, and a chill struck at Haynes' stout old heart as he learned that the enemy did have negative-matter bombs.

Upon that point there had been much discussion. One view was that the Boskonians would have them, since they had seen them in action and since their scientists were fully as capable as were those of Civilization. The other was that, since it had taken all the massed intellect of the Conference of Scientists to work out a method of handling and of propelling such bombs, and since the Boskonians were probably not as co-operative as were the civilized races, they could not have them.

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light cruisers of Grand Fleet were bombers. This was deliberate, for in the use of the new arm there were involved problems which theoretical strategy could not solve definitely. Theoretically, a bomber could defeat a conventional light cruiser of equal tonnage one hundred percent of the time, *provided*—here was the rub!—that the conventional cruiser did not blast her out of the ether before she could get her bombs into the vitals of the foe, in order to accommodate the new equipment, something of the old had to be decreased—something of power, of armament, of primary or secondary beams, or of defensive screen. Otherwise the size and mass must be so increased that the ship would no longer be a light cruiser, but a heavy one.

And the Patrol's psychologists had had ideas, based upon facts which they had gathered from Kinnison and from Illona and from various and sundry spools of tape—ideas by virtue of which it was eminently possible that the conventional light cruisers of Civilization, with their heavier screen and more and hotter beams, could vanquish the light cruisers of the foe, even though they should turn out to be negative-matter bombers.

Hence the fifty-fifty division of types; but, since Haynes was not thoroughly sold upon either the psychologists or their ideas, the commanders of his standard light cruisers had received very explicit and definite orders. If the Boskonians should have bombs and if the high-brows' ideas did not pan out, they were to turn tail and run, at maximum and without stopping to ask questions or to get additional instructions.

Haynes had not really believed that the enemy would have negabombs, they were so new and so atrociously difficult to handle. He wanted—but was unable—to believe implicitly in the psy-

chologists' findings. Therefore, as soon as he saw what was happening, he abandoned his tank for a moment to seize a plate and get into full touch with the control room of one of the conventional light cruisers then going into action.

He watched it drive boldly toward a Boskonian vessel which was in the act of throwing bombs. He saw that the agile little vessel's tractor zone was out. He watched the bombs strike that zone and bounce. He watched the tractor men go to work and he saw the psychologists' idea bear splendid fruit. For what followed was a triumph, not of brute force and striking power, but of morale and manhood. The brain men had said, and it was now proved, that the Boskonian gunners, low class as they were and driven to their tasks like the slaves they were, would hesitate long enough before using tractor beams as pressors so that the Patrolmen could take their own bombs away from them!

For negative matter, it must be remembered, is the exact opposite of ordinary matter. It is built up of negative mass; in every equation of physics and mechanics where mass appears, a minus sign appears when negative matter is concerned. To it a pull is, or becomes, a push; the tractor beam which pulls ordinary matter toward its projector actually pushes negative matter away.

The "boys" of the Patrol knew that fact thoroughly. They knew all about what they were doing, and why. They were there because they wanted to be, as Illona had so astoundingly found out, and they worked with their officers, not because of them. With the Patrol's gun crews it was a race to see which crew could capture the first bomb and the most.

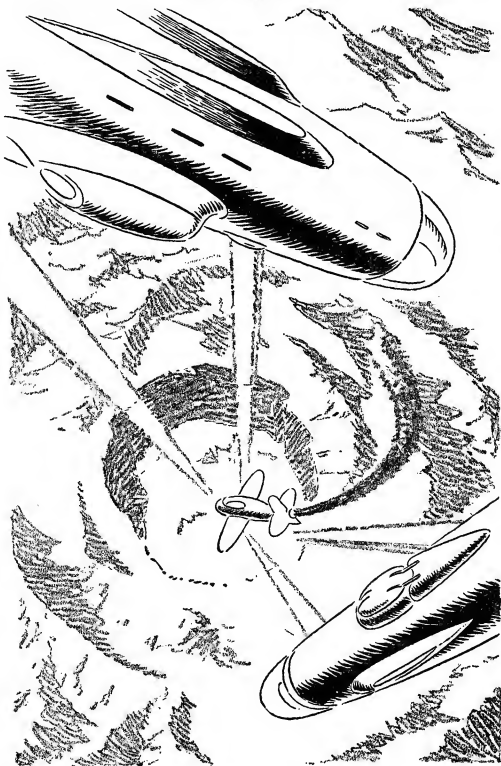
Aboard the Boskonian how different it was! There the dumb cattle had been told what

to do, but not why. They did not know the fundamental mechanics of the bomb tubes they operated by rote, did not know that they were essentially tractor beam projectors. They did know, however, that tractor beams pulled things toward them; and when they were ordered to swing their ordinary tractors upon the bombs which the Patrolmen were so industriously taking away from them, they hesitated for seconds, even under the lash.

This hesitation was fatal. Haynes' gleeful gunners, staring through their special finders, were very much on their toes; seconds were enough. Their fierce-driven tractors seized the inimical bombs in midspace, and before the Boskonians could be made to act in the only possible opposition hurled them directly backward against the ship which had issued them. Ordinary defensive screen did not affect them; repulsor screen, meteorite and wall shields only sucked them inward the faster.

And ordinary matter and negative matter cannot exist in contact. In the instant of touching, one atom of negative matter and one of normal matter unite and disappear. One negabomb was enough to put any cruiser out of action, but here there were usually three or four at once. Sometimes as many as ten; enough, almost, to consume the total mass of a ship.

A bomb struck; ate in. Through solid armor it melted. Atmosphere rushed out, to disappear en route—for air is normal matter. Along beams and trusses the hellish hypersphere traveled freakishly, although usually in the direction of greatest mass. It clung, greedily. Down stanchions it flowed; leaving nothing in its wake, flooding all circumambient space with lethal emanations. Into and through converters. Into pressure tanks which blew up enthusiastically. Men's bodies it did not seem to favor—not mas-



*Immaterial fingers of tractor rays snatched at the plane an instant before it crashed—*

sive enough, perhaps—but even them it did not refuse if offered. A Boskonian, gasping frantically for air which was no longer there and already half mad, went completely mad as he struck savagely at the thing and saw his hand and his arm to the shoulder vanish instantaneously, as though they had never been.

AST—8a

Satisfied, Haynes wrenched his attention back to his tank. Most of his light cruisers were through and in the clear; they were reporting by thousands. Losses were very small. The conventional-type cruisers had won either by using the enemies' own bombs, as he had seen them used, or by means of their heav-

ier armor and armament. The bombers had won in almost every case; not by superior force, for in arms and equipment they were to all intents and purposes identical with their opponents, but because of their infinitely higher quality of personnel. To brief it, scarcely a handful of Boskonian's light

cruisers were able to flee the fatal scene.

The heavy cruisers came up, broke formation, and went doggedly to work. They were the blockers. Each took one ship—a heavy cruiser or a battleship—out of the line, and held it out. It tried to demolish it with every weapon it could swing, but even if it could not vanquish its foe, it could and did hang on until some big bruiser of a battleship could come up and administer the *coup de grâce*.

And battleships and superdreadnoughts were coming up in the thousands and the myriads. All of them, in fact, but those enough to form a tight globe, packed screen to screen, around the *Z9M9Z*.

Slowly, ponderously, inert, the war head of maulers came crawling up. The maulers and fortresses of the Boskonians were hopelessly outnumbered and were badly scattered in position. Hence this meeting of the ultra-heavies was not really a battle at all, but a slaughter. Ten or more of Haynes' gigantic structures could concentrate their entire combined fire power upon any luckless one of the enemy; with what awful effect it would be superfluous to enlarge upon.

When the mighty fortresses had done their work they inglobed the *Directrix*, enabling the guarding battleships to join their sister moppers-up; but there was very little left to do. Civilization had again triumphed; and, this time, at very little cost. Some of the pirates had escaped, of course; observers from afar might very well have had scanners and recorders upon the entire conflict; but, whatever of news was transmitted or how, Alcon of Thrale and Boskonian's other master minds would or could derive little indeed of comfort from the happenings of this important day.

"Well, that is that—for a while, at least, don't you think?"

Haynes asked his Council of War.

It was decided that it was; that if Boskonian could not have mustered a heavier center for her defensive action here, she would be in no position to make any really important attack for months to come.

Grand Fleet, then, was reformed; this time into a purely defensive and exploratory formation. In the center, of course, was the *Z9M9Z*. Around her was a close-packed quadruple globe of maulers. Outside of them in order, came sphere after sphere of superdreadnoughts, of battleships, of heavy cruisers, and of light cruisers. Then, not in globe at all, but ranging far and wide, were the scouts. Into the edge of the nearest spiral arm of the Second Galaxy the stupendous formation advanced, and along it it proceeded at dead-slow blast—dead-slow, to enable the questing scouts to survey thoroughly each planet of every solar system as they came to it.

And finally an Earthlike planet was found. Several approximately Tellurian worlds had been previously discovered and listed as possibilities; but this one was so perfect that the search ended then and there. Apart from the shape of the continents and the fact that there was somewhat less land surface and a bit more salt water, it was practically identical with Tellus. As was to be expected, its people were human to the limit of classification. Entirely unexpectedly, however, the people of Klovian—which is as close as English can come to the native name—were not zwilniks. They had never heard of, nor had they ever been approached by, the Boskonians. Space travel was to them only a theoretical possibility, as was atomic energy.

They had no planetary organization, being still divided politically into sovereign states which were all too often at war with

each other. In fact, a world war had just burned itself out, a war of such savagery that only a fraction of the world's population remained alive. There had been no victor, of course. All had lost everything—the survivors of each nation, ruined as they were and without either organization or equipment, were trying desperately to rebuild some semblance of what they had once had.

Upon learning these facts the psychologists of the Patrol breathed deep sighs of relief. This kind of thing was made to order; civilizing this planet would be simplicity itself. And it was. The Klovians did not have to be overawed by a show of superior force. Before this last, horribly internecine war, Klovian had been a heavily industrialized world, and as soon as the few remaining inhabitants realized what Civilization had to offer, that no one of their neighboring competitive states was to occupy a superior position, and that full, world-wide production was to be resumed as soon as was humanly possible, their relief and joy were immeasurable.

Thus the Patrol took over without difficulty. But they were, the Lensmen knew, working against time. As soon as the zwilniks could get enough heavy stuff built they would attack, grimly determined to blast Klovian and everything upon it out of space. Even though they had known nothing about the planet previously, it was idle to hope that they were still in ignorance either of its existence or of what was in general going on there.

Haynes' first care was to have the heaviest metalry of the Galactic Patrol—loose planets, sunbeams, fortresses, and the like—rushed across the void to Klovian at maximum. Then, as well as putting every employable of the new world to work, at higher wages than he had ever earned before, the Patrol imported millions upon millions of men, with their women and families, from

hundreds of Earthlike planets in the First Galaxy.

They did not, however, come blindly. They came knowing that Klovvia was to be primarily a military base, the most supremely powerful base that had ever been built. They knew that it would bear the brunt of the most furious attacks that Boskone could possibly deliver; they knew full well that it might fall. Nevertheless, men and women, they came in their multitudes. They came with high courage and high determination, glorying in that which they were to do. People who could and did so glory were the only ones who came; which fact accounts in no small part for what Klovvia is today.

People came, and worked, and stayed. Ships came, and trafficked. Trade and commerce increased tremendously. And further and further abroad, as there came into being upon that formerly almost derelict planet some seventy-odd gigantic defensive establishments, there crept out an ever-widening screen of scout ships, with all their high-powered feelers hotly outstretched.

Meanwhile Kinnison and frigid-blooded Nadreck had worked their line, leg by tortuous leg, to Onlo and thence to Thrale. A full spool should be devoted to that working alone; but, unfortunately, as space here must be limited to the barest essentials, it can scarcely be mentioned. As Kinnison and Haynes had foreseen, that line was heavily trapped. Luckily, however, it had not been moved so radically that the searchers could not rediscover it; the zwilniks were, as Haynes had promised, very busily engaged with other and more important matters. All of those traps were deadly, and many of them were ingenious indeed—so ingenious as to test to the utmost the "cowardly" Palainian's skill and mental scope. All, however, failed.

The two Lensmen held to the line in spite of the pitfalls and followed it to the end. Nadreck stayed upon or near Onlo, to work in its frightful environment against the monsters to whom he was biologically so closely allied, while the Tellurian went on to Thrale, to try conclusions with that planet's physically human tyrant, Alcon.

Again he had to build up an unimpeachable identity and here there were no friendly thousands to help him do it. He had to get close—*really* close—to Alcon, without antagonizing him or in any way arousing his hair-trigger suspicions. Kinnison had studied that problem for days. Not one of his previously used artifices would work, even had he dared to repeat a procedure. Also, time was decidedly of the essence.

There was a way. It was not an easy way, but it was fast and, if it worked at all, it would work perfectly. Kinnison would not have risked it even a few months back, but now he was pretty sure that he had jets enough to swing it.

He needed a soldier of about his own size and shape—details were unimportant. The man should not be in Alcon's personal troops, but should be in a closely allied battalion, from which promotion into that select body would be logical. He should be relatively inconspicuous, yet with a record of accomplishment, or at least of initiative, which would square up with the rapid promotions which were to come.

The details of that man hunt are interesting, but not of any real importance here, since they did not vary in any essential from other searches which have been described at length. He found him—a lieutenant in the Royal Guard—and the ensuing mind study was as assiduous as it was insidious. In fact, the Lensman memorized practically every memory chain in the fellow's brain. Then the officer

took his regular furlough and started for home—but he never got there.

Instead, it was Kimball Kinnison who wore the Thralian's gorgeous full-dress uniform and who greeted in exactly appropriate fashion the Thralian's acquaintances and lifelong friends. A few of these, who chanced to see the guardsman first, wondered briefly at his changed appearance or thought that he was a stranger. Very few, however, and very briefly; for the Lensman's sense of perception was tensely alert and his mind was strong. In moments, then, those chance few forgot that they had ever had the slightest doubt concerning this soldier's identity; they knew calmly and as a matter of fact that he was the Traska Gannel whom they had known so long.

Living minds presented no difficulty except for the fact that of course he could not get in touch with everyone who had ever known the real Gannel. However, he did, his best. He covered plenty of ground and he got most of them—all that could really matter.

Written records, photographs, and tapes were something else again. He had called Worsel in on that problem long since, and the purely military records of the Royal Guards were QX before Gannel went on leave. Although somewhat tedious, that task had not proved particularly difficult. Upon a certain dark night a certain light circuit had gone dead, darkening many buildings. Only one or two sentries or guards had put their flashlights upon either Worsel or Kinnison, and they never afterward recalled having done so. And any record that has ever been made can be remade to order by the experts of the Secret Service of the Patrol!

And thus it was also with the earlier records. Gannel had been born in a hospital. QX—that hospital was visited, and there-

after Gannel's baby footprints were actually those of infant Kinnison. He had gone to certain schools—those schools' records also were made to conform to the new facts.

Little could be done, however, about pictures. No man can possibly remember how many times he has had his picture taken, or who has the negatives, or to whom he had given photographs, or in what papers, books, or other publications his likeness has appeared.

The older pictures, Kinnison decided, did not count. Even if the likenesses were good, he looked enough like Gannel so that the boy or the callow youth might just about as well have developed into something that would pass for Kinnison in a photograph as into the man which he actually did become. Where was the dividing line? The Lensman decided—or rather, the decision was forced upon him—that it was at his graduation from the military academy.

There had been an annual, in which volume appeared an individual picture, fairly large, of each member of the graduating class. About a thousand copies of the book had been issued, and now they were scattered all over space. Since it would be idle even to think of correcting them all, he could not correct any of them. Kinnison studied that picture for a long time. He didn't like it very well. The cub was just about grown up, and this photo looked considerably more like Gannel than it did like Kinnison. However, the expression was self-conscious, the pose strained—and, after all, people hardly ever looked at old annuals. He'd have to take a chance on that. Later poses—formal portraits, that is; snapshots could not be considered—would have to be fixed up.

Thus it came about that certain studios were raided very surreptitiously. Certain negatives were abstracted and were

deftly re-retouched. Prints were made therefrom, and in several dozens of places in Gannel's home town, in albums and in frames, stealthy substitutions were made.

The furlough was about to expire. Kinnison had done everything that he could do. There were holes, of course—there couldn't help but be—but they were mighty small and, if he played his cards right, they would never show up. Just to be on the safe side, however, he'd have Worsel stick around for a couple of weeks or so, to watch developments and to patch up any weak spots that might develop. The Velantian's presence upon Thrale would not create any suspicion—there were lots of such folks flitting from planet to planet—and if anybody did get just a trifle suspicious of Worsel, it might be all the better.

So it was done, and Lieutenant Traska Gannel of the Royal Guard went back to duty.

## XVI.

Nadreck, the furtive Palainian, had prepared as thoroughly in his own queerly underhanded fashion as had Kinnison in his bolder one. Nadreck was cowardly, in Earthly eyes, there can be no doubt of that; as cowardly as he was lazy—or at least, if not exactly lazy, highly averse to any unnecessary effort. To his race, however, those traits were eminently sensible; and those qualities did in fact underlie his prodigious record of accomplishment. Being so careful of his personal safety, he had lived long and would live longer; by doing everything in the easiest possible way he had conserved his resources. Why take chances with a highly valuable life? Why be so inefficient as to work hard in the performance of a task when it could always be done in some easy way?

Nadreck moved in upon Onlo, then, absolutely imperceptibly.

His dark, cold, devious mind, so closely akin to those of the Onlonians, reached out, indetectably *en rapport* with theirs. He studied, dissected, analyzed and neutralized their defenses, one by one. Then, his ultra-black speedster securely hidden from their every prying mechanism and sense, although within easy working distance of the control dome itself, he snuggled down into his softly cushioned resting place and methodically, efficiently, he went to work.

Thus, when Alcon of Thrale next visited his monstrous henchmen, Nadreck flipped a switch and every thought of the zwilnik's conference went permanently on record.

"What have you done, Kandron, about the Lensman?" the Tyrant demanded in harsh tones. "What have you concluded?"

"We have done very little," the chief psychologist replied, coldly. "Beyond the liquidation of a few Lensmen—with nothing whatever to indicate that any of them had any leading part in our recent reverses—our agents have accomplished nothing.

"As to conclusions, I have been unable to draw any except the highly negative one that every Boskonian psychologist who has ever summed up the situation has, in some respect or other, been seriously in error."

"And only you are right!" Alcon sneered. "Why?"

"I am right only in that I admit my inability to draw any valid conclusions," Kandron replied, imperturbably. "The available data are too meager, too inconclusive, and above all, too contradictory to justify any positive statements. There is a possibility that there are two Lensmen who have been and are mainly responsible for what has happened. One of these, the lesser, may be—note well that I say 'may be,' not 'is'—a Tellurian or an Aldebaranian or some other definitely human being; the other and by far the more powerful one is apparently ab-

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solutely and entirely unknown, except by his works."

"Star A Star," Alcon declared.

"Call him so if you like," Kandron assented, flatly. "But this Star A Star is an operator. As the supposed Director of Lensmen he is merely a figment of the imagination."

"But this information came from the Lensman Morgan!" Alcon protested. "He was questioned under the drug of truth; he was tortured and all but slain; the Overlord of Delgon consumed all his life force except for the barest possible moiety!"

"How do you know all these things?" Kandron asked, unmoved. "Merely from the report of the Overlord and from the highly questionable testimony of one of the Eich, who was absent from the scene during all of the most important time?"

"You suspect, then, that—" Alcon broke off, shaken visibly.

"I do," the psychologist replied, dryly. "I suspect very strongly indeed that there is working against us a mind of a power and scope, but little inferior to my own. A mind able to overcome that of an Overlord; one able at least if unsuspected and hence unopposed, to deceive even the admittedly capable minds of the Eich. I suspect that the Lensman Morgan was, if he existed at all, merely a puppet. The Eich took him too easily by far. It is, therefore, eminently possible that he had no physical actuality of existence—"

"Oh, come, now! Don't be ridiculous!" Alcon snapped. "With all Boskone there as witnesses? Why, his hand and Lens remained!"

"Impossible, perhaps, I admit—but still eminently possible," Kandron insisted. "Admit for the moment that he was actual, and that he did lose a hand—but remember also that the hand and the Lens may very well have been brought along and left there as reassurances; we cannot be

sure even that the Lens matched the hand. But admitting all this, I am still of the opinion that Lensman Morgan was not otherwise tortured, that he lost none of his vital force, that he and the unknown I have already referred to returned practically unharmed to their own galaxy. And not only did they return, they must have carried with them the information which was later used by the Patrol in the destruction of Jarnevon."

"Utterly preposterous!" Alcon snorted. "Tell me, if you can, upon what facts you have been able to base such fantastic opinions."

"Gladly," Kandron assented. "I have been able to come to no really valid conclusions, and it may very well be that your fresh viewpoint will enable us to succeed where I alone have failed. I will, therefore, summarize very briefly the data which seem to me most significant. Attend closely, please:

"For many years, as you know, everything progressed smoothly. Our first setback came when a Tellurian warship, manned by Tellurians and Valerians, succeeded in capturing almost intact one of the most modern and most powerful of our vessels. The Valerians may be excluded from consideration, in so far as mental ability is concerned. At least one Tellurian escaped, in one of our own, supposedly derelict, vessels. This one, whom Helmuth thought of, and reported, as 'the' Lensman, eluding all pursuers, went to Velantia; upon which planet he so wrought as to steal bodily six of our ships sent there especially to hunt him down. In those ships he won his way back to Tellus in spite of everything Helmuth and his force could do.

"Then there were the two episodes of the Wheelmen of Aldebaran I. In the first one a Tellurian Lensman was defeated—possibly killed. In the second our base was destroyed—trace-

lessly. Note, however, that the base next above it in order was, so far as we know, not visited or harmed.

"There was the Boyssia affair, in which the human being Blakeslee did various unscheduled things. He was obviously under the control of some far more powerful mind; a mind which did not appear, then or ever.

"We jump then to this, our own galaxy—the sudden, inexplicable disappearance of the planet Medon.

"Back to theirs again—the disgraceful and closely connected debacles at Shingvors and Antigan. Traceless both, but again neither was followed up to any higher headquarters."

Nadreck grinned at that, if a Palainian can be said to grin. Those matters were purely his own. He had done what he had been requested to do—thoroughly—no following up had been either necessary or desirable.

"Then Radelix," Kandron's summary went concisely on. "The female agents, Bominger, the Kalonian observers—all wiped out. Was or was not some human Lensman to blame? Everyone, from Chester Q. For-dyce down to a certain laborer upon the docks, was suspected, but nothing definite could be learned.

"The senselessly mad crew of the *27L462P*—Wynor—Grantlia. Again completely traceless. Reason obscure, and no known advantage gained, as this sequence also was dropped."

Nadreck pondered briefly over this material. He knew nothing of any such matters nor, he was pretty sure, did Kinnison. The Lensman apparently was getting credit for something that must have been accidental or wrought by some internal enemy. QX. He listened again:

"After the affair of Bronseca, in which so many Lensmen were engaged that particularization was impossible, and which again



was not followed up, we jump to the Asteroid Euphrosyne, Miner's Nest, and Wild Bill Williams of Aldebaran II. If it was a coincidence that Bill Williams became William Williams and followed our line to Tressilia, it is a truly remarkable one—even though, supposedly, said Williams was so stupefied with drugs as to be incapable either of motion or perception.

"Jalte's headquarters was, apparently, missed. However, it must have been invaded—tracelessly—for it was the link between Trellilia and Jarnevon, and Jarnevon was found and was destroyed.

"Now, before we analyze the more recent events, what do you yourself deduce from the above facts?" Kandrón asked.

While the Tyrant was cogitating, Nadreck indulged in a minor gloat. This psychologist, by means of impeccable logic and reasoning from definitely known facts, had arrived at *such* erroneous conclusions! However, Nadreck had to admit, his own performances and those in which Kinnison had acted undetectably, when added to those of some person or persons unknown, did make a really impressive total.

"You may be right," Alcon admitted finally. "At least two entirely different personalities and methods of operation. Two Lensmen are necessary to satisfy the above requirements—and, as far as we know, sufficient. One of the necessary two is a human being, the other an absolutely unknown. Cartiff was, of course, the human Lensman. A masterly piece of work, that—but, with the co-operation of the Patrol, both logical and fairly simple. This human being is always in evidence, yet is so cleverly concealed by his very obviousness that nobody ever considers him important enough to be worthy of a close scrutiny. Or—perhaps—"

"That is better," Kandrón commented. "You are beginning

to see why I was so careful in saying that the known Tellurian factor 'may be,' not 'is,' of any real importance."

"But he *must* be!" Alcon protested. "It was a human being who tried and executed our agent; Cartiff was a human being—to name only two."

"Of course," Kandrón admitted half contemptuously. "But we have no proof whatever that any of those human beings actually did, of their own volition, any of the things for which they have been given credit. Thus, it is now almost certain that that widely advertised 'mind-ray machine' was simply a battery of spotlights—the man operating them may very well have done nothing else. Similarly, Cartiff may have been an ordinary gangster controlled by the Lensman—we may as well call him Star A Star as anything else—or a Lensman or some other member of the Patrol acting as a dummy to distract our attention from Star A Star, who himself did the real work, all unperceived."

"Proof?" the Tyrant snapped. "No proof—merely a probability," the Onlonian stated flatly. "We *know*, however, definitely and for a fact—visiplates and long-range communicators cannot be hypnotized—that Blakeslee was one of Helmut's own men. Also that he was the same man, both as a loyal Boskonian of very ordinary mental talents and as an enemy having a mental power which he as Blakeslee never did and never could possess."

"I see," Alcon thought deeply. "Very cogently put. Instead of there being two Lensmen, working sometimes together and sometimes separately, you think that there is only one really important mind and that this mind at times works with or through some Tellurian?"

"But not necessarily the same Tellurian—exactly. And there is nothing to give us any indication whatever as to Star A Star's real

nature or race. We cannot even deduce whether or not he is an oxygen breather—and that is bad."

"Very bad," the Tyrant assented. "Star A Star, or Cartiff or both working together, found Lonabar. They learned of the Overlords, or at least of Lyrane II—"

"By sheer accident, if they learned it there at all, I am certain of that," Kandrón insisted. "They did not get any information from Menjo Bleeko's mind; there was none there to get."

"Accident or not, what boots it?" Alcon impatiently brushed aside the psychologist's protests. "They found Bleeko and killed him. A raid upon the cavern of the Overlords upon Lyrane II followed immediately. From the reports sent by the Overlords to the Eich of Lyrane VIII we know that there were two Patrol ships involved. One, not definitely identified as Cartiff's, took no part in the real assault. The other, the superdreadnought *Dauntless*, did that alone. She was manned by Tellurians, Valerians, and at least one Velantian. Since they went to the trouble of taking the Overlords alive, we may take it for granted that they obtained from them all the information they possessed before they destroyed them and their cavern?"

"It is at least highly probable that they did so," Kandrón admitted.

"We have, then, many questions and few answers," and the Tyrant strode up and down the dimly blue-lit room. "It would be idle, indeed, in view of the facts, to postulate that Lyrane II was left, as were some others, a dead end. Has Star A Star attempted Lyrane VIII? If not, why has he delayed? If so, did he succeed or fail in penetrating the defenses of the Eich? They swear that he did not, that he could not—"

"Of course," Kandrón sneered.

"But while asking questions, why not ask why the Patrol chose this particular time to invade our galaxy in such force as to wipe out our Grand Fleet? To establish themselves so strongly as to make it necessary for us of the High Command to devote our entire attention to the problem of dislodging them?"

"What!" Alcon exclaimed, then sobered quickly and thought for minutes. "You think, then, that—" His thoughts died away.

"I do so think," Kandron thought, glumly. "It is very decidedly possible—yes, perhaps even probably—that the Eich of Lyrane VIII were able to offer no more resistance to the penetration of Star A Star than was Jalte the Kalonian. That this massive thrust was timed to cover the insidious tracing of our lines of communication or whatever other leads the Lensman had been able to discover."

"But the traps—the alarms—the screens and zones!" Alcon exclaimed, manifestly jarred by this new and disquietingly keen thought.

"No alarm was tripped, as you know; no trap was sprung," Kandron replied, quietly. "The fact that we have not as yet been attacked here may or may not be significant. Not only is Onlo very strongly held, not only is it located in such a central position that their lines of communication would be untenable, but also—"

"Do you mean to admit you may have been invaded and searched—tracelessly?" Alcon fairly shrieked the thought.

"Certainly," the psychologist replied, coldly. "While I do not believe that it has been done, the possibility must be conceded. What we could do, we have done; but what science can do, science can circumvent. To finish my thought, it is a virtual certainty that it is not Onlo and I who are their prime objectives,

but Thrale and you. Especially you."

"You may be right. You probably are right; but with no data whatever upon who or what Star A Star really is, with no tenable theory as to how he could have done what actually has been done, speculation is idle."

Upon this highly unsatisfactory note the interview closed. Alcon the Tyrant went back to Thrale; and as he entered his palace grounds he passed within forty inches of his Nemesis. For Star A Star-Kinnison-Traska Gannel was, as Alcon himself so clearly said, rendered invisible and imperceptible by his own obviousness.

Although obvious, Kinnison was very busy indeed. As a lieutenant in charge of a platoon whose duties were primarily upon the ground, he had very little choice of action. His immediate superior, the first lieutenant of the same company, was not much better off. The captain had more authority and scope, since he commanded aerial as well as ground forces. Then, disregarding side lines of comparative seniority, came the major, the colonel, and finally the general, who was in charge of all the regular armed forces of Thrale's capital city. Alcon's personal troops were, of course, a separate organization, but Kinnison was not interested in them—yet.

The major would be high enough, Kinnison decided. Big enough to have considerable authority and freedom of motion, and yet not important enough to attract undesirable attention.

The first lieutenant, a stodgy, strictly rule-of-thumb individual, did not count. He could step right over his head into the captaincy. The real Gannel had always, in true zwilnik fashion, hated his captain and had sought in devious ways to undermine him. The pseudo-Gannel de-

spised the captain as well as hating him, and to the task of sapping he brought an ability enormously greater than any which the real Gannel had ever possessed.

Good Boskonian technique was to work upward by stealth and treachery, aided by a carefully built-up personal following of spies and agents. Gannel had already formed such a staff; had already selected the man who, in the natural course of events, would assassinate the first lieutenant. Kinnison retained Gannel's following, but changed subtly its methods of operation. He worked almost boldly. He himself criticized the captain severely, within the hearing of two men whom he knew to belong, body and soul, to his superior.

This brought quick results. He was summoned pre-emptorily to the captain's office; and, knowing that the company commander would not dare to have him assassinated there, he went. In that office there were a dozen people; it was evident that the captain intended this rebuke to be a warning to all upstarts, forever.

"Lieutenant Traska Gannel, I have had my eye upon you and your subversive activities for some time," the captain ordered. "Now, purely as a matter of form, and in accordance with Paragraph 5, Section 724 of General Regulations, you may offer whatever explanation before I reduce you to the ranks for insubordination."

"I have a lot to say," Kinnison replied, coolly. "I don't know what your spies have reported, but to whatever it was I would like to add that having this meeting here as you are having it proves that you are as fat in the head as you are in the belly—"

"Silence! Seize him, men!" the captain commanded, fiercely. He was not really fat. He had only a scant inch of equatorial bulge; but that small surplusage

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was a sore point indeed. "Dis-arm him!"

"The first man to move dies in his tracks," Kinnison countered; his coldly venomous tone holding the troopers motionless. He wore two hand weapons more or less similar to DeLameters, and now his hands rested lightly upon their butts. "I cannot be disarmed until after I have been disrated, as you know very well; and that will never happen. For, if you demote me, I will take an appeal, as is my right, to the colonel's court, and there I will prove that you are stupid, inefficient, cowardly, and unfit generally to command. You really are, and you know it. Your discipline is lax and full of favoritism; your rewards and punishments are assessed, not by logic, but by whim, passion, and personal bias. Any court that can be named would set you down into the ranks, where you belong, and would give me your place. If this is insubordination and if you want to make something out of it, you pussy-gutted, pusillanimous, brainless tub of lard, cut in your jets!"

The maligned officer half rose, white-knuckled hands gripping the arms of his chair, then sank back craftily. He realized now that he had blundered; he was in no position to face the rigorous investigation which Gannel's accusation would bring on. But there was a way out. This could now be made a purely personal matter, in which a duel would be *de rigueur*. And in Boskonian dueling the superior officer, not the challenged, had the choice of weapons. He was a master of the saber; he had outpointed Gannel regularly in the regimental games. Therefore he choked down his wrath and:

"These personal insults, gratuitous and false as they are, take the matter out of military channels," he declared smoothly. "Meet me, then, tomorrow, half an hour before sunset, in the Place of Swords. It will be with sabers."

"Accepted." Kinnison meticulously followed the ritual. "To first blood or to the death?" This question was superfluous—the stigma of the Lensman's epithets, delivered before such a large group, could not possibly be expunged by the mere letting of a little blood.

"To the death"—curtly.

"So be it, O Captain!" Kinnison saluted punctiliously, executed a snappy about-face, and marched stiffly out of the room.

QX. This was fine—strictly according to Hoyle. The captain was a swordsman, surely; but Kinnison was no slouch. He didn't think that he would have to use a thought beam to help him. He had had five years of intensive training. Quarterstaff, nightstick, club, knife, and dagger; foil, *épée*, rapier, saber, broadsword, scimitar, bayonet, what have you—with practically any nameable weapon any Lensman had to be as good as he was with fists and feet.

The Place of Swords was in fact a circular arena, surrounded by tiers of comfortably padded seats. It was thronged with uniforms, with civilian formal afternoon dress, and with modish gowns; for such duels as this were sporting events of the first magnitude.

To guard against such trickery as concealed armor, the contestants were almost naked. Each wore only silken trunks and a pair of low shoes, whose cross-ribbed, flexible composition soles could not be made to slip upon the corrugated surface of the corklike material of the arena's floor.

The colonel himself, as master of ceremonies, asked the usual perfunctory questions. No, reconciliation was impossible. No, the challenged would not apologize. No, the challenger's honor could not be satisfied with anything less than mortal combat. He then took two sabers from an orderly, measuring them to be sure that they were of

precisely the same length. He tested each edge for keenness, from hilt to needle point, with an expert thumb. He pounded each hilt with a heavy testing club. Lastly, still in view of the spectators, he slipped a guard over each point and put his weight upon the blades. They bent alarmingly, but neither broke and both snapped back truly into shape. No spy or agent, everyone then knew, had tampered with either one of those beautiful weapons.

Removing the point guards, the colonel again inspected those slenderly lethal tips and handed one saber to each of the duelists. He held out a baton, horizontal and shoulder high. Gannel and the captain crossed their blades upon it. He snapped his stick away and the duel was on.

Kinnison fought in Gannel's fashion exactly; in his characteristic crouch and with his every mannerism. He was, however a trifle faster than Gannel had ever been—just enough faster so that by the exertion of everything he had of skill and finesse, he managed to make the zwilnik's blade meet steel instead of flesh during the first long five minutes of furious engagement. The guy was good, no doubt of that. His saber came writhing in, to disarm. Kinnison flicked his massive wrist. Steel slithered along steel; hilt clanged against heavy basket hilt. Two mighty right arms shot upward, straining to the limit. Breast to hard-ridged breast, left arms pressed against bulgingly corded backs, every taut muscle from floor-gripping feet up to powerful shoulders thrown into the effort, the batlers stood motionlessly *en tableau* for seconds.

The ape wasn't fat, at that, Kinnison realized then; he was as hard as cordwood underneath. Not fat enough, anyway, to be anybody's push-over; although he was probably not in good-enough shape to last very long—he could probably wear

him down. He wondered fleetingly, if worse came to worst, whether he would use his mind or not. He didn't want to—but he might have to. Or would he, even then—could he? But he'd better snap out of it. He couldn't get anywhere with this body-check business; the zwilnik was fully as strong as he was.

They broke, and in the breaking Kinnison learned a brand-new cut. He sensed it coming, but he could not parry or avoid it entirely; and the crowd shrieked madly as the captain's point slashed into Gannel's trunks and a stream of crimson trickled down Gannel's left leg.

*Stamp! Stamp!* Cut, thrust, feint, slash and parry, the grim game went on. Again, in spite of all he could do, Kinnison was pinked; this time by a straight thrust aimed at his heart. He was falling away from it, though, so got only half an inch or so of the point in the fleshy part of his left shoulder. It bled spectacularly, however, and the throng yelled raptly for the kill. Another—he never did know exactly how he got that one—in the calf of his right leg; and the bloodthirsty mob screamed still louder.

Then, the fine edge of the captain's terrific attack worn off, Kinnison was able to assume the offensive. He maneuvered his foe into an awkward position, swept his blade aside, and slashed viciously at the neck. But the Thralian was able partially to cover. He ducked frantically, even while his parrying blade was flashing up. Steel clanged, sparks flew; but the strength of the Lensman's arm could not be entirely denied. Instead of the whole head, however, Kinnison's razor-edged weapon nicked off only an ear and a lock of hair.

Again the spectators shrieked frenzied approval. They did not care whose blood was shed, so long as it was shed; and this duel, of two superb swordsmen

so evenly matched, was the best they had seen for years. It was, and promised to keep on being, a splendidly gory show indeed.

Again and again the duelists engaged at their flashing top speed; once again each drew blood before the colonel's whistle shrilled.

Time out for repairs: to have either of the contestants bleed to death, or even to the point of weakness, was no part of the code. The captain had outpointed the lieutenant, four to two, just as he always did in the tournaments; but he now derived very little comfort from the score. He was weakening, and knew it, while Gannel's arm seemed as strong and as rock-steady as it had been at the bout's beginning. Kinnison also knew these facts.

Surgeons gave hasty but effective treatment, new and perfect sabers replaced the badly nicked weapons, the ghastly thing went on. The captain tired slowly but surely; Gannel took, more and more openly and more and more savagely, the offensive.

When it was over Kinnison flipped his saber dexterously, so that its point struck deep into the softly resilient floor beside that which had once been his captain. Then, while the hilt swung back and forth in slow arcs, he faced one segment of the now satiated throng and crisply saluted the colonel.

"Sir, I trust that I have won honorably the right to be examined for fitness to become the captain of my company?" he asked, formally; and:

"You have, sir," the colonel as formally replied.

## XVII.

Kinnison's wounds, being superficial, healed rapidly. He passed the examination handsily. He should have; since, although it was rigorous and comprehensive, Traska Gannel himself could have passed it and Kinnison, as well as knowing practi-

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cally everything that the Thralian had ever learned, had his own vast store of knowledge upon which to draw. Also, if necessary, he could have read the answers from the minds of the examiners.

As a captain, the real Gannel would have been a hard and brilliant commander, noticeable even among the select group of tried and fire-polished veterans who officered the Guards. Hence Kinnison became so; in fact, considerably more so than most. He was harsh, he was relentless and inflexible; but he was absolutely fair. He did not punish a given breach of discipline with twenty lashes one time and with a mere reprimand the next; fifteen honest, scarring strokes it became for each and every time, whoever the offender. Whatever punishment a man deserved by the book he got, promptly and mercilessly; whatever reward was earned was bestowed with equal celerity, accompanied by a crisply accurate statement of the facts in each case, at the daily parade review.

His men hated him, of course. His noncoms and lieutenants, besides hating him, kept on trying to cut him down. All, however, respected him and obeyed him without delay and without question, which was all that any Boskonian officer could expect and which was far more than most of them ever got.

Having thus consolidated his position, Kinnison went blithely to work to undermine and to supplant the major. Since Alcon, like all dictators everywhere, was in constant fear of treachery and of revolution, war games were an almost constant form of drill. The general himself planned and various officers executed the mock attacks, by space, air, and land; the Royal Guards and Alcon's personal troops, heavily outnumbered, always constituted the defense. An elaborate system of scoring had been worked out long since, by means of which the staff officers could study in

detail every weak point that could be demonstrated.

"Captain Gannel, you will have to hold Passes 25, 26, and 27," the obviously worried major told Kinnison, the evening before a particularly important sham battle was to take place.

The Lensman was not surprised. He himself had insinuated the idea into his superior's mind. Moreover, he already knew, from an intensive job of spying, that his major was to be in charge of the defense, and that the colonel, who was to direct the attacking forces, had decided to route his main column through Pass 27.

"Very well, sir," Kinnison acknowledged. "I wish to protest formally, however, against those orders. It is manifestly impossible, sir, to hold all three of those passes with two platoons of infantry and one squadron of speedsters. May I offer a suggestion?"

"You may not," the major snapped. "We have deduced that the real attack is coming from the north, and that any activity in your section will be merely a feint. Orders are orders, captain!"

"Yes, sir," Kinnison replied, meekly, and signed for the thick sheaf of orders which stated in detail exactly what he was to do.

The next evening, after Kinnison had won the battle by disregarding every order he had been given, he was summoned to the meeting of the staff. He had expected that, too, but he was not at all certain of how it was coming out. It was in some trepidation, therefore, that he entered the lair of the big brass hats.

"Har-rumph!" he was greeted by the adjutant. "You have been called—"

"I know why I was called," Kinnison interrupted, brusquely. "Before we go into that, however, I wish to prefer charges before the general against Major



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however, instead of doing so, he violated another Boskonian precedent by having a frank talk with the man whom normally he should have been trying to displace.

"You have found out that you can't kill me, colonel," he told his superior, after making sure that the room was really shielded. "Also that I can quite possibly kill you. You know that I know more than you do—that all my life, while you other fellows were helling around, I have been working and learning—and that I can, in a fairly short time, take your job away from you without killing you. However, I don't want it."

"You don't want it!" The colonel stared, narrow-eyed. "What do you want, then?" He knew, of course, that Gannel wanted something.

"Your help," Kinnison admitted, candidly. "I want to get onto Alcon's personal staff, as adviser. With my experience and training, I figure that there's more in it for me there than here in the Guards. Here's my proposition—if I help you, by showing you how to work out your field problems and in general building you up however I can instead of tearing you down, will you use your great influence with the general and Prime Minister Fosten to have me transferred to the Household?"

"Will I? I'll say I will!" the colonel agreed, with fervor. He did not add "if I cannot kill you first"—that was understood.

And Kinnison did build the colonel up. He taught him things about the military business which that staff officer had never even suspected; he sounded depths of strategy theretofore completely unknown to the zwilnik. And the more Kinnison taught him, the more eager the colonel became to get rid of him. He had been suspicious and only reluctantly cooperative at first; but as soon as he realized that he could not kill

his tutor and that if the latter stayed in the Guards it would be only a matter of days—at most of weeks—until Gannel would force himself into the colonelcy by sheer force of merit, he pulled in earnest every wire that he could reach.

Before the actual transfer could be effected, however, Kinnison received a call from Nadreck.

"Excuse me, please, for troubling you," the Palainian apologized, "but there has been a development in which you may perhaps be interested. This Kandrion has been given orders by Alcon to traverse a hyperspatial tube, the terminus of which will appear at co-ordinates 217-493-28 at hour eleven of the seventh Thralian day from the present."

"Fine business! And you want to chase him, huh?" Kinnison jumped at the conclusion. "Sure—go ahead. I'll meet you there. I'll fake up some kind of an excuse to get away from here and we'll run him ragged!"

"I do not," Nadreck interrupted, decisively. "If I leave my work here, it will all come undone. Besides, it would be dangerous—and foolhardy. Not knowing what lies at the other end of that tube, we could make no plans and could have no assurance of safety, or even of success. You should not go, either—that is unthinkable. I am reporting this matter in view of the possibility that you may think it significant enough to warrant the sending of some observer whose life is of little or no importance."

"Oh . . . uh-huh . . . I see. Thanks, Nadreck." Kinnison did not allow any trace of his real thought to go out before he broke the line. Then:

"Funny ape, Nadreck," he cogitated, as he called Haynes. "I don't get his angle at all—I simply can't figure him out. Haynes? Kinnison"—and he reported in full.





scure fashion which permits him neither to move from his place nor to remain where he is. It is a painless but utterly revolting transformation, progressing in a series of waves; a rearrangement, a writhing, crawling distortion, an incomprehensibly impossible extrusion of each ultimate particle of his substance in an unknowable, ordinarily nonexistent direction.

The period of acceleration over, the *Dauntless* traveled at uniform velocity along whatever course it was that the tube took and the men, although highly uncomfortable and uneasy, could once more move about and work. Sir Austin Cardyng in particular was actually happy and eager as he flitted from one to another of the automatic recording instruments upon his special panel. He resembled more closely than ever a lean, gray tomcat, Kinnison thought—he almost expected to see him begin to lick his whiskers and purr.

"You see, my ignorant young friend"—the scientist almost did pur as one of the recording pens swung widely across the ruled paper—"it is as I told you—the lack of exact data upon even one tiny factor of this extremely complex phenomenon is calamitous. While my notes were apparently complete and were certainly accurate, our experimental tubes did not function perfectly. The time factor was irreconcilable—completely so, in every aspect, even that of departure from and return to normal space—and it is unthinkable that time, one of the fundamental units, is or can be intrinsically variable—"

"You think so?" Kinnison broke in. "Look at that"—pointing to the ultimate of timepieces, Cardyng's own triplex chronometer. "No. 1 says that we have been in this tube for an hour, No. 2 says a little over nine minutes, and according to

No. 3 we won't be starting for twenty minutes yet—it must be running backward—let's see you comb *that* out of your whiskers!"

"Oh-h . . . ah . . . a-hum." But only momentarily was Sir Austin taken aback. "Ah, I was right all the time!" he cackled gleefully. "I thought it practically impossible for me to commit an error or to overlook any possibilities, and I have now proved that I did not. Time, in this hyperspatial region or condition, is intrinsically variable, in major degree!"

"And what does that get you?" Kinnison asked, pointedly.

"Much, my impetuous youngster, much," Cardyng replied. "We observe, we note facts. From the observations and facts we theorize and we deduce; thus arriving very shortly at the true inwardness of time."

"You hope," the Lensman snorted, dubiously; and in his skepticism he was right and Sir Austin was wrong. For the actual nature and mechanism of time remained, and still constitute, a mystery, or at least an unsolved problem. The Arisians—perhaps—understand time; no other race does.

To some of the men, then, and to some of the clocks and other time-measuring devices, the time seemed—or actually was?—very long; to other and similar beings and mechanisms it seemed—or was—short. Short or long, however, the *Dauntless* did not reach the Boskonian end of the hyperspatial tube.

In midflight there came a crunching, twisting *cloonk!* and an abrupt reversal of the inexplicably horrible interdimensional acceleration—a deceleration as sickeningly disturbing, both physically and mentally, as the acceleration had been.

While within the confines of the hyperspatial tube every eye of the *Dauntless* had been blind.

To every beam upon every frequency, visible or invisible, ether-borne or carried upon the infinitely faster waves of the sub-ether, the murk was impenetrable. Every plate showed the same mind-numbing blankness; a vague, eerily shifting, quasi-solid blanket of formless, textureless grayness. No lightness or darkness, no stars or constellations or nebulae, no friendly, deep-space blackness—nothing.

Deceleration ceased; the men felt again the wonted homelessness and comfort of normal pseudo-inertia. Simultaneously the gray smear of the visiplates faded away into commonplace areas of jetty black, pierced the brilliantly dimensionless varicolored points of light which were the familiar stars of their own familiar space.

But were they familiar? Was that our galaxy, or anything like it? They were not. It was not. Kinnison stared into his plate, aghast.

He would not have been surprised to have emerged into three-dimensional space anywhere within the Second Galaxy. In that case, he would have seen a Milky Way; and from its shape, apparent size, and texture he could have oriented himself fairly closely in a few minutes. But the *Dauntless* was not within any lenticular galaxy—nowhere was there any sign of a Milky Way!

He would not have been really surprised to have found himself and his ship out in open intergalactic space. In that case he would have seen a great deal of dead-black emptiness, blotched with a hundred or so lenticular bodies which were in fact galaxies. Orientation would then have been more difficult; but, with the aid of the Patrol charts, it could have been accomplished. But here there were no galaxies—no nebulae of any kind!

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